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CLOSE OF THE NEW YORK EXHIBITION

MOTOR VEHICLE MANUFACTURERS FORM AN ASSOCIATION FOR MUTUAL BENEFIT—A DINNER TO THE EXHIBITORS—A RETROSPECT OF THE SHOW

New York, Nov. 10.—The Madison Square Garden automobile show closed to-night with a splendid attendance—the best of the week—and much good feeling on the part of the management, of the exhibitors and of the patrons. The afternoon crowd was large and representative of New York's demi-fashionable element, which is interested in automobiles, but careless enough to wait until the last day before paying respects to the steed of the future. From 1 o'clock to 6 and from 8 until 11 in the evening all aisles, exhibit spaces and many gallery seats were filled. The influx of procrastinators, added to the attendance of regular day-after-day visitors, made the scene in the garden a lively one to say the least.

Not Many Sales Made

Whether or not much direct business was done by the exhibitors is a doubtful question, as most of their time was taken up in talking to the "smart set" and in giving as many as could be accommodated rides upon the testing track. Toward the close of the evening, however, several of the vehicles which had stood during the week in exhibits were run out

onto the track for practical demonstration and these increased the number of running carriages to an extent which made the track seem a never-stopping merry-go-round. It seems to be the general opinion that the best time for shows is in the spring, at a time when both agents and the public are ready to buy.

As to the Value of the Show

To say whether or not the show has been a success would be a hard matter. The management, the Automobile Club of America, is satisfied, and the exhibitors express themselves as being gratified with results. It was evident throughout the week, however, that it is the intention of the Automobile Club to make the show annually a society affair in emulation of the horse show. Of course, the present patrons of the automobile are the wealthier classes, but the dealers who were present at the Garden looking for agencies paid strictest attention to motocycles and light runabouts, showing that the fashionable element will not long be the sole participants in automobile riding.

Society or the Trade?

It is thus an open question whether the manufacturers should stick to society or play for general trade. If the latter be the wiser policy, the fashionable show cannot long be the most successful show for the manufacturer. His interests, after the days of novelty are over, will be trade interests, and trades people should be the ruling element at his shows.

VIEW OF THE MADISON SQUARE GARDEN EXHIBITION FROM THE EAST END.

During the Week

A really better idea of the show could be obtained during the middle of the week, after the enthusiasm and confusion and hurry of the opening days were over and before the influx of a host of procrastinating visitors and preparations for departure and plans for the newly born association of manufacturers claimed attention. A view of the show

during the middle of the week will, therefore, give one the best idea of what it really was. There is to be noticed the same class of society people that were seen in the early days, but there is also a perceptible increase in the number of people in the trade—dealers looking for agencies—who are seen moving from exhibit to exhibit, examining the different models with a careful scrutiny that proclaims more than a mere passing interest.

Popular Interest in the Track

The interest of the popular visitors is centered mainly on the track which furnishes a never-ending spectacle of moving motor-vehicles of all kinds and sizes, some quiet, some noisy, some simple, some complicated, some unpretentious, some grand, some heavy, some light, some fast, some slow, sometimes singly, sometimes in pairs, often three abreast, never faster than the moderate speed limit prescribed by the management.

Visiting Trades People

The visiting trades people, on the other hand spent most of their time examining the vehicles exhibited at the various individual displays and in the balcony where are the booths of the parts and accessories makers and jobbers. Many old time bicycle dealers and repairers who are intending to enter the automobile trade are busy studying various motors and appurtenances with view to assembling moto-cycles and light automobiles during the winter months.

Society in the Evenings

In the evening society turns out to a moderate extent and with it a couple of thousand or more less conspicuous persons who come to see rather than to be seen. For the edification of these, short programs of obstacle and brake contests are given which sustain interest but do not afford the lively amusement which the visitors gain from watching the regular parade of the various vehicles. The contests are of necessity somewhat slow, as the small size and low banking of the track prevent speed competition and the competitive running of more than one carriage upon the track at one time; whereas the showing off of the vehicles presents an endless circle of color and noise which pleases, instructs and seems to satisfy.

VIEW OF THE MADISON SQUARE GARDEN EXHIBITION FROM ABOVE THE ENTRANCE.

The First General View

Visitors when first entering the garden stop on the main bridge over the track to view the scene as a whole, then descend to the main floor to inspect the various carriages there displayed, and after having made the rounds of the ex-

hibits, hunt suitable seats in the balconies and boxes from which to watch the motor whirligig on the track, the diminutive size of which makes ten miles per hour seem fast.

The character of visitors may be fairly judged by the vehicles they inspect, just as a man may be judged by the company he keeps. A certain class spend most of the attention upon the handsome electric equipages, comparing, criticising and praising magnificent cabriolets, brakes and broughams. This is "society."

The Sporting Features

Around the displays in which are shown fast machines, little and big, another class gathers and discusses more or less fictitious horsepower, records and notable performances. This is the sporting element, which cannot pass either in or out of the building without stopping a second to look at the Bostwick Panhard in the entrance and draw private conclusions concerning the greatness of that notorious machine.

Another species of show visitor haunts the headquarters of vehicles for business purposes and talks maximum speed, load, cost per mile and numerous other practical points with the makers of delivery wagons and freight trucks. The wholesale and retail merchant is thus evident.

The Well-to-do People

Runabouts, stanhopes, voiturettes and moto-cycles with three and four wheels receive a whole lot of attention from people who are obviously desirous of securing carriages for business or pleasure going without being compelled to part with the major share of the surplus earnings which have placed them upon the society shelf labeled "well-to-do citizens." In and out, hunting vehicles and things heard of but not yet seen, scurries the enthusiast who feels that he knows something about the motor vehicle industry and fears to lose an opportunity to complete that knowledge.

Looking for Agencies

In the balcony fingering motors and sparking coils, pinching tires and asking questions, running down stairs to "meet a party," taking trial rides on the track, studying catalogues in quiet corners, making brief notes on the backs of envelopes and paying particular attention to vehicles which sell for $800 or less, is the person who goes by the title "retailer," and expects to become one of the important necessities of an infant industry.

Here, there and everywhere, with pockets and arms striving to sustain loads of catalogues and circulars, with eyes wandering without objective point, with unloaded hands pointing hither and thither for the direction of companions' vision, with tongue saying "thank you," to those who proffer additional brochures, is the general public in the guise of the person who is interested, reads the papers, wishes he might, but hasn't the price.

Little Excitement

In the way of news, the show does not furnish much. Exhibitors generally express themselves as satisfied with the class of visitors, their numbers and the orders placed by them. It is a pleasant gathering. Manufacturers, dealers and public meet and shake hands. Some business is done. A good orchestra enlivens the affair. No smoking is allowed. Much talk there is of you and I and then no more of you and I as the stronghold of the next exhibitor is reached. Faces familiar to each other because of previous associations in the bicycle trade are often seen to nod recognition or to open simultaneously in conversation. The tide of attendance ebbs and flows twice a day. Conversations drift from election to carbureters, and from carbureters to election—and that's about all.

Track Competitions

Despite the fact that most all of Greater New York was on the street Tuesday evening watching the election bulletins and getting merrily and transitorily acquainted with itself, the garden was favored with a fair sized gathering whose constituents were willing to postpone the joys and disappointments of campaign results until after they had, from boxes, balcony seats and main floor, watched the rubber-tired "wheels go round," to their hearts' contentment. Two contests of vehicle management comprised the

formal portion of the evening's program.

A Gasmobile Wins

The first was a brake contest for gasolene vehicles. Each contesting vehicle ran fifty yards at full speed and then stopped as soon as the skill of the rider, its braking mechanism and enertia would permit. This event was won by a Gasmobile driven by F. W. Walsh, who stopped his carriage in 16 feet 9 inches after the pistol was fired. Vehicles of the Duryea Motor Co., International Motor Carriage Co., Ohio Automobile Co. and the Holyoke Automobile Co. also competed.

An Obstacle Race

The second and concluding event was an obstacle race for gasolene vehicles. It was fifty yards in length and the competitors drove their vehicles over a sinuous and cranky course laid out among barrels, posts, gateways, etc. The Automobile Co. of America's Gasmobile again won, the machine covering the distance in 36 3-5 seconds. The Holyoke carriage was second in :47 2-5, while those of the International and Ohio companies tied for third.

Lack of Entries

Although a large audience of society and other folks was on hand for the contests Wednesday evening, these were stricken from the schedule on account of lack of entries and the visitors contented themselves with informal amusement and profit seeking. This was society's night and the boxes were filled with persons who annually form the most notable patrons of the horse show. Many of them came in motor carriages, although that night, as well as all others during the week, several submissive equines were forced to stand by the half hour with their noses poked up near brilliantly colored auto show posters and their ears contracted to shut out the strains of the "Automobile March" wafted from the orchestra within.

Best of the Week

A higher mark of sport and amusement was attained Thursday evening and the crowd was the largest of the week. The contests were livelier and hence more amusing than those of previous evenings. The first was a starting contest for gasolene vehicles, it being ruled that each carriage should be standing with the motor cold and with the driver on foot 50 feet behind. At the crack of the pistol the driver ran to his vehicle, started the engine, jumped in and rode fifty yards. But one vehicle was on the track at a time and the driver and machine completing the task in the short est time were declared winner. The two scoring the fastest times competed in a final.

Walsh Wins Again

In the "heats" a Gasmobile driven by F. W. Walsh did the best, the start and 50-foot run being made in sixteen and one-fifth seconds. A Knox three-wheeled gasolene runabout scored second best time in :17 4-5, with two Packard vehicles, made by the Ohio Automobile Co., respectively third and fourth, in :19 3-5 and :20 3-5. In the final the Knox runabout was disabled by a broken chain soon after the start and the Gasmobile secured the prize without competition in slower time than that of its first trial.

The Gymkhana Pleases

The audience was much pleased and the English automobile gymkhana brought to mind by the other event of the evening, which was a coat and waistcoat contest of three laps' duration for tricycles. There were five contestants. The men were required to run 50 feet to their respective tricycles, mount and start, ride 50 yards to a post, dismount, remove their coats and hang them on the post, remount and ride to another post on which, after dismounting, the vests must be hung, then remount, ride around to the posts and in turn secure both vest and coat, and after having put them on, button them completely while riding the final lap.

Pink Shirt Wins

The announcer was facetious and instead of introducing the riders by name, designated them by the color of their shirts and the spectators enjoyed themselves, commenting privately and audibly upon the winning chances of the red, white, blue, heliotrope and pink shirt men. In the trials the pink shirt

rider of an Orient tricycle made the best time, his disrobing act consuming two minutes and thirty-seven and three-fifths seconds. Henri Brandt, who acts as assistant track manager, and who, together with W. H. Stearn, manages to keep the drivers of the constantly running vehicles on the track from scorching and running into each other, made second best time in 2:38 1-5. He would doubtless have carried off first honors in the trials but for a sad mistake in judging the distance ahead of a post whereupon hung his vest. The mistake cost him a wrong stop and several seconds of valuable time, but furnished the audience with material for audible smiles and comment. In the final he retrieved himself, however, winning in 2:26 1-5 from the Orient pink shirt rider.

Friday's Competitions

The first contest Friday night was a brake competition for electric carriages, being run the same as previous events of the kind, with a flying, full-speed start of about fifty yards.

A machine of the National Automobile & Electric Co. stopped in 12 feet 6 inches. The vehicle of the Riker Motor Vehicle Co. covered 14 feet 5 inches in coming to a halt, while the Woods machine took 23 feet 5 inches to accomplish the task. Two Baker electrics which were entered managed to stop in 11 feet and 6 feet 10 inches, respectively, but owing to the fact that their drivers had slowed them down previous to crossing the braking line they were disqualified. The Riker and National vehicles were thus brought together in the final, which was won by the former with 10 feet 7 inches.

An Event for Owners

The other event of the evening was an obstacle race for electric delivery wagons, open, not to manufacturers, but to owners of vehicles. A Stern Brothers wagon captured first by covering the stipulated distance in 1:01 1-5. A New York World wagon was second in :44 2-5 and a pretty vehicle devoted to spreading the fame of a brand of cigarettes was third in :40 3-5. The seeming discrepancies in time was due to the drivers of the wagons allowed second and third being unable in their haste to manipulate the course without knocking down mock fences and scraping the bark from dummy posts. Several other vehicles also competed in this event.

Saturday's Events

The Saturday evening championship brake and obstacle contests between the winners of the previous events for the three classes of vehicles were run. In the brake competition a Riker electric secured first by stopping in 14 feet 6 1-2 inches, with an Automobile Co. of America's gasolene carriage second in 17 feet 1-2 an inch, and a steam Locomobile third in 27 feet 8 1-2 inches.

The same order of electric, gasolene and steam was the result of the obstacle contest. A Baker electric won in :24 4-5, with the Automobile Co. of America's gasolene carriage second in :28 1-5, and the Locomobile third in :31 1-5.

Comparison of times between obstacle races of different nights is impossible, owing to changes of length of courses.

Exhibitors Who Arrived Late

Among the several exhibitors who did not have their displays installed in time for the full account published in the last issue of the Motor Age is the Haynes-Apperson Co. of Kokomo, Ind. Tuesday this energetic firm placed two of their well known gasolene carriages, one single and one double seat, on exhibition in their space in the annex and filled the reservoir of another with gasolene preparatory to practical demonstration on the track.

Several smaller exhibits were also arranged Tuesday. One of these, in the annex, presented Averell's "Tit for tap," a compound for rendering bicycle and automobile pneumatic tires undamagable by puncture.

Booming Immersion Brazing

In connection with the balcony exhibit of the Joseph Dixon Crucible Co., the Industrial Cycle Mfg. Co. of Springfield, Mass, showed two models of its bicycles for 1901. These, it is stated, are brazed by the liquid or immersion process and the crucibles used for the purpose are Dixon's. The Dixon company is endeavoring to interest automobile manufacturers in immersion brazing and at its dis-

play, in addition to showing a dip brazing crucible, had ready for distribution copies of the valuable booklet on the subject reprinted for the company from a series of articles which appeared in the Cycle Age.

Familiar to all who have visited bicycle and motor-vehicle shows during the last three years is the face of W. H. Rathbun of Chicago, who, during the early part of the week established himself in one of the balcony booths with two bicycles equipped with his patented spring wheels, which he thinks will supplant pneumatic tires.

Additions to Exhibits

Several of the exhibitors established at the opening of the show also made additions to their displays as the week progressed. To the exhibit of the Waltham Mfg. Co. was added an Orient Victoriette and the steam omnibus of the New York Motor Vehicle Co. was supplemented by a light steam runabout whose engine burner, like that of the larger vehicle consumes kerosene instead of the usual gasolene.

Duryea's Original Winner

The loan exhibit of the Automobile Club of America was increased in interest by the addition of the original Duryea gasolene carriage which won the Chicago Times-Herald contest in 1895, and Bishop's famous 16-horsepower "white flyer," a gigantic Panhard racer similar with the exceptions of colors and power to the Bostwick Panhard. A Thornycroft lorrie or freight truck also made its appearance on Tuesday.

MOBILE CO. OF AMERICA'S MILITARY MACHINE.

Among the several small additions made to the displays of the accessories exhibits in the balcony a notable item was a motor bicycle frame made by the Regas Vehicle Co. of Rochester, N. Y. This frame, which is adapted to receive almost any standard bicycle motor and which is familiar in connection with the name of Henry Sager, is at the booth of

Charles E. Miller & Co., at whose display The Motor Age four-horsepower motor now being made by the Lowell Model Works of Lowell, Mass., is attracting considerable attention.

A Military Vehicle

One other interesting late comer is the military steam vehicle made by the Mobile Co. of America. This wagon, with three passengers, left Kingsland Point Wednesday morning and covered the thirty-two miles to Madison Square Garden, New York city, in sixty-five minutes. Those who made the trip on it state that this excellent reputed time was made possible by good roads all of the way. In addition to its passengers, the vehicle carried 1,000 rounds of ammunition, four army rifles, equipment and kit for four soldiers, two intrenching shovels, food for three days for four men, fuel for a 200-mile run and two rubber side shelters.

McDuffee as a Soldier

After its arrival, the army wagon was detailed to parade service on the track and it has attracted more than a little comment, although its appearance is neither warlike nor striking. It has a long body with a seat at each end. On the front seat are two soldiers, one of which, in the present instance, is Eddie McDuffee in the disguise of a national guardsman, and on the rear seat are two more, looking backward as if to watch the approach of the enemy. The vehicle is guaranteed, it is said, to cover 100 miles at one priming at a speed of twelve miles per hour.

Melange of Show Items

President Shattuck paid his first visit to the show on the closing night.

At a booth in the balcony the New York Tribune exhibited the Mobile which it will give away as prize in a popular voting contest.

Before the week was over "Sold" signs appeared on several of the vehicles exhibited. These were mainly equipages of the stylish order.

During the week Manager Gates, of the Baldwin Chain Co., was busy hustling around among exhibitors looking for and booking orders. He was always glad to point out that most chain driven vehicles shown were fitted with the Baldwin product.

The Electric Vehicle Co. operated its own charging station in its exhibit space.

A fair visitor Thursday night was heard to inquire: "Are the ones with the incandescent signs above them the electrics?"

Albert Champion, with his arm in a sling, was a daily graphical demonstration that it does not always pay to be the most reckless motocycle rider of them all.

Those who passed the booth of the Hub stopped a second or two to notice the demonstration being given by a working model of the Chandler railway block system.

Several prominent manufacturers of bicycles and bicycle material who are not as yet directly identified with the automobile industry were regular visitors during the week.

When exhibitors were asked Saturday whether or not they expected to show at the Central Palace exhibition next week but few were found who stated definitely that they would do so.

The various patterns of spider runabouts exhibited attracted much inspection from parties particularly interested in gasolene. The small gasolene carriage with air cooled motor seems to be gaining favor.

In making the rounds of the exhibits one could not fail to notice the growing tendency toward steering wheels on gasolene carriages in place of the steering lever which was first adopted as standard American practice.

George Banker, who recently returned from Europe, was at the show with a powerful French racing tricycle. No speed demonstration was made on the garden track, but George claims that the machine can easily make more than forty miles an hour. It has two motors and is rated at 6-horsepower.

The Steamobile Co. of Keene, N. H., issued cards at the show stating that residents of Greater New York could, by leaving their addresses, secure the privilege of a 20-mile ride and practical demonstration some time during the month of November. The present New York

city address of this company is 73 Fifth Avenue.

One day during the week gasolene, which had leaked from some vehicle, caused a fire in the space at the east end of the building which was used as stable space for the vehicles which were driven for exhibition and demonstration upon the track. Although considerable excitement and hurried speculation prevailed no serious damage resulted.

Although the recently organized Cooke Locomotive & Motor Co .of Paterson, N. J., did not exhibit at the show it caused considerable comment every time during the week when its gigantic Thornycroft freight van made its appearance in the neighborhood of the garden. This company is to build in America vehicles similar to the Thornycroft truck, which are already well known in Europe.

Friday and Saturday the Regas motor bicycle made its appearance on the track. Mr. Sager, when speaking of it, said that the only difficulty experienced with it was that it was too fast for the almost flat turns of the garden track and that he had been "called down" several times by the track manager for scorching. "The slowest speed of the Regas," said Mr. Sager, "is faster than the speed limit of that track."

A certain part of the lay public would be better off in the minds of exhibitors if it would refrain from asking questions. At one gasolene motor display a gentleman was heard to inquire: "Will you take one of those motors apart and show me the spring which makes the piston go back after an explosion?" At another display a visitor asked the purpose of the water cooling tubes on the front of the dash and then wanted to know whether the motor was air or water cooled.

Several times the comment was made by professional attendants at the show that the motor vehicle industry offered a good chance for the commercial development of contrivances which had failed to attain a valuable position in the bicycle trade. In illustration the Brown-Lipe bi-gear, which never obtained wide usage on bicycles, was pointed out, the gear now having been developed into a successful transmission device for automobiles. Further illustrations of possibilities in this line are the puncture-proof and non-slipping tire, back rests for saddles, spring wheel supports, brake devices and roller bearings.

At the display of the Metallic Rubber Tire Co. was an interesting demonstration of the traction advantages of the metal studded tire tread. On a slab of greasy asphalt was mounted revolubly a wheel fitted with an ordinary pneumatic auto tire held against the asphalt by a fifty pound weight. By its side was similarly arranged a wheel fitted with a Metallic Rubber tire. Each tire was fitted with a handle which permitted the visitor to turn the wheels. Of course, the regular tire would slip on the asphalt while the Metallic Rubber tire refused to budge.

Much difference of opinion was current concerning the exact pitch of the different slopes of the Mobile incline on the roof and many different figures were given by those who should have known. Also considerable discussion prevailed concerning the difference between angular degrees and grade percent of inclines. The figures given in the last issue of The Motor Age were doubtless too high. From the builder of the incline the following figures were obtained: Bottom runway, 20 degrees, first steep grade, 35 degrees; middle grade, 37½ degrees; top grade, 32 degrees. Regardless, however, of the correct figures concerning the grade there is no doubt that it furnished an excellent advertisement for the Mobile Co., or that it presented an excellent performance. The average time taken by Joseph McDuffee and his Mobile to climb the 200-foot incline was 20 seconds, although on special trials the grade was climbed at a much faster gait—McDuffee claiming 14 seconds for one trip. The steam pressure at the start was generally about 160 pounds, and this was reduced from ten to fifteen pounds in the climb.

In the official catalogue all exhibitors were numbered, and when their respective vehicles appeared on the track corresponding numbers displayed on them told the spectator the make of the machines. Still, however, because of the

American's aversion to studying catalogues when he wishes to watch sights only those few carriages which also displayed flags bearing the name of the machine to which they were attached, were recognized by the laity who viewed them from the balcony. It would have been inexpensive and valuable advertising had all of the makers attached plain sign cards or flags to their track machines.

A DINNER FOR EXHIBITORS

Friday evening the management, the Automobile Club of America, gave a dinner to the manufacturers who exhibited at the show. About 250 were present. Vice-President Albert C. Bostwick of the club presided. The dinner was an informal affair and few speeches were made, although the number was not indicative of their character or the interest they sustained. Mr. Bostwick in his brief opening speech expressed regret that family bereavement had prevented President Shattuck from attending the show to see the success which his energetic work of preparation had obtained.

Professor Thurston Talks

Professor R. H. Thurston gave an interesting synopsis of the development of the automobile. George F. Chamberlain, one of the founders of the club, outlined some of the work of the club and its future plans and spoke briefly concerning its desired relations with manufacturers, and S. T. Davis, Jr., supplemented his talk with remarks along the same lines.

Mr. Eddy's Humorous Address

Arthur J. Eddy, president of the Chicago Automobile Club, gave an address from the standpoint of a practical automobilist and interested all by his apt remarks concerning the many small difficulties which beset the career of the chaffeur. He shot good-natured arrows at steam, electric and gasolene vehicles alike and made a hit by saying that he really enjoyed lying on his back on a country road underneath an automobile looking for the troublesome part which refused to "go." Then he added: "This, however, is nothing compared with the enjoyment of being on an electric vehicle on a country wayside and having the sensation of the machine gradually coming to a stop like grandfather's clock, with no charging station nearer than the next village saloon."

But Manufacturers are Kept Quiet

The peculiar feature of the dinner was that, while the occasion was supposed to be in the honor of the manufacturers whose exhibits had made the show a success, and while the Automobile Club repeatedly expressed itself as having the greatest deference for the manufacturers, but one manufacturer, one exhibitor —and he a member of the club—was asked to say a word formally to the participants. Instead, the makers, who stood the expense of the exhibition, were simply gathered together and afforded the patronizing privilege of listening to automobile club members tell of the greatness of automobile clubs. Albert C. Bostwick, owner of a 24-horsepower French locomotive, certainly does not strike one as being the type of man to serve as a mentor to the American automobile trade!

THE MANUFACTURERS MEETING

At 11 o'clock Saturday morning the representatives of over thirty different manufacturers of automobiles and parts gathered in the press room at the Garden to discuss plans for effecting a permanent national organization of manufacturers. This meeting was due to a call issued by the few who attended a first meeting at the Hoffman House Thursday morning, on which occasion insufficient attendance prevented any action being taken.

The Original Purpose Forgotten

The original purpose of the assembly is hazy in the minds of nearly all, those present at the Saturday meeting being content to view the affair in the light of a gathering for the purpose of general organization without immediate specific purpose. An interesting side light is thrown on the whole affair, however, by the knowledge that the original promoter and stimulant was (for he is no more) the publisher of an automobile trade paper who thought that he could

rush motor vehicle manufacturers into hasty convention to sign a warrant to boycott the Chicago automobile show to be held next March in the big Coliseum under the direction of The Motor Age, this publisher having shown childish jealousy toward this paper.

The Meeting Was Not Influenced

The meeting of Saturday, however, showed very clearly that automobile manufacturers are not willing to be manipulated by an infantile politician for they declined to take any definite action concerning any show, to organize to restrict members' individual liberty in exhibiting where they please or to recognize the fact that the publisher in question had anything to do with the meeting. Ignoring the sly purpose of the original call, those present took advantage of the gathering to lay plans for the formation of a national organization of unlimited utility and purpose.

Election of Officers and Committee

The first business was the selection of temporary officers and John Brisben Walker, owner of the Cosmopolitan magazine and ruling spirit of the Mobile Co. of America, was chosen chairman of the meeting, with E. Ralph Estep, of The Motor Age as secretary.

After a brief discussion concerning the policy of the meeting, it was moved that a committee be elected to take in hand the preparation of necessary organization papers. On motion the committee was given power to draft and adopt constitution and by-laws, elect officers for the first year and to secure a certificate of incorporation. The committee was also given authority to increase its number should such course be deemed necessary by it.

Members of the Committee

The following eleven gentlemen were chosen to act upon this committee: S. T. Davis, Jr., of the Locomobile Co. of America; Charles E. Miller; A. L. Riker, of the Riker Motor Vehicle Co.; W. C. Baker, of the Baker Motor Vehicle Co.; E. P. Wells, of the Steamobile Co.; John Brisben Walker, of the Mobile Co. of America; Charles E. Duryea, of the Duryea Power Co.; J. M. Hill, of the Electric Vehicle Co.; Alexander Winton, of the Winton Motor Carriage Co.; C. J. Field, of the De Dion-Bouton Motorette Co., and A. S. Winslow, of thme International Motor Carriage Co.

Outline no Definite Course

After considerable discussion concerning the purposes of the proposed association it was agreed that no definite course in any matter should be hastily laid out and that the signatures secured to a resolution of authorization to the organization committee stand also as meaning that the meeting willed only to form an association to advance and protect the interests of the trade without committing itself at present to any specific purpose.

A General Discussion

After the necessary business had been completed the meeting was thrown open to discussion of points of interest to manufacturers. Good roads, relations with automobile clubs, freight tariffs and shows were among the topics touched. During the discussions of exhibitions the sentiment was broached by several that one regular show in the east and one in the west would be sufficient, and many seemed to favor the spring as the most suitable time, although there was a division of opinion on this latter point.

No Pledges as to Shows

An attempt was made to secure a resolution concerning the kind of shows at which the makers should exhibit, but the more thoughtful and conservative element present prevailed and it was finally agreed that although an association be perfected no member should be pledged for or against any particular shows, but should be allowed to exercise his own judgment about exhibiting. It was further resolved that when any show should be proposed a consensus of opinion concerning it be gathered by the secretary and the numerical result of the mail vote be forwarded to each member so that he would be in a good position to decide whether or not he cared to exhibit. It was decided that it would be unfair to include in the statement of this result the names of those who favored exhibition at the show in question at the time, the secretary's announcement being merely given in figures to

show the general attitude of the members.

A letter addressed to the meeting from The Motor Age concerning The Motor Age show was read and it was moved that the letter be printed and copies forwarded to all manufacturers for their consideration.

Plan a Meeting for Buffalo

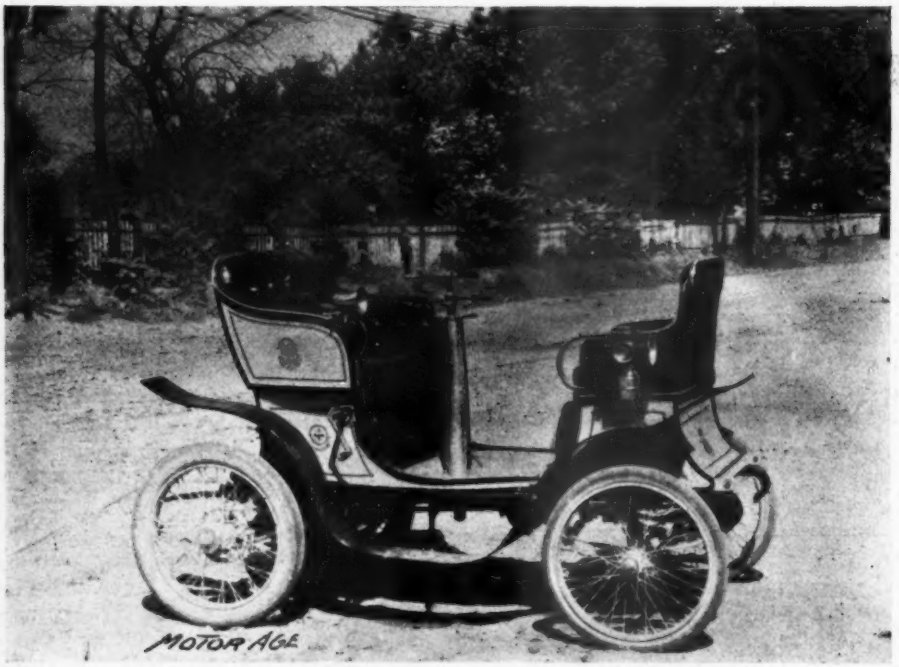
It was moved that the organization committee be instructed to call the body together in general convention at some suitable time during the Pan-American exposition at Buffalo. The convention to be thus called was urged as the first of a series of annual conventions, at which all the members might meet to discuss important trade topics.

The Automobile Club of America was given a vote of thanks for its able management of the garden show.

THE OTHER NEW YORK SHOW

New York, Nov. 12.—With the closing of the show at Madison Square Garden on Saturday night exhibitors began preparations to move their exhibits to the Grand Central Palace, where a second show, to last ten days and continue through horse-show week, opens on Wednesday night.

To-day the Grand Central Palace presents a busy scene of preparation. The center space on the main floor is reserved for the track and moving exhibits. A fine view is obtainable from the surrounding galleries on the floor above. The standing exhibits occupy the rest of the great floor on four sides.



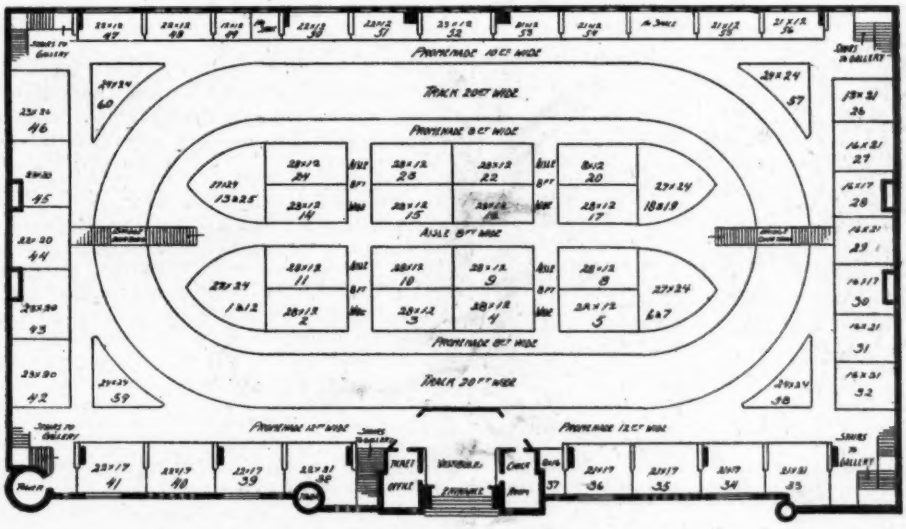
NEW YORK TYPE DE DION MOTORETTE.

CHICAGO MOTOR VEHICLE SHOW

PLAN OF THE FLOOR SPACE OF THE EXHIBITION, TOGETHER WITH A DESCRIPTION OF THE INTERIOR OF THE CHICAGO COLISEUM AND THE RULES UNDER WHICH THE SHOW WILL BE RUN

Diagrams of the arrangement of exhibition spaces for the motor vehicle exhibition to be held in the big Chicago Coliseum March 23 to 30 are out, as well as the rules governing the show and applications for space. It was not the intention of The Motor Age, under whose management the show will be given, to have put out this printed matter until a considerably later date, but they have received so many urgent requests that already made informal application for the reservation of space at the Chicago Coliseum, it appears certain that the capacity of that building will be taxed to the limit by the first awarding of space. The nature of the building will make it impossible to add any annex, and the exhibitors will therefore doubtless be confined to those who get in their applications prior to December 15.

The accompanying illustration shows



PLAN OF THE CHICAGO MOTOR VEHICLE EXHIBITION.

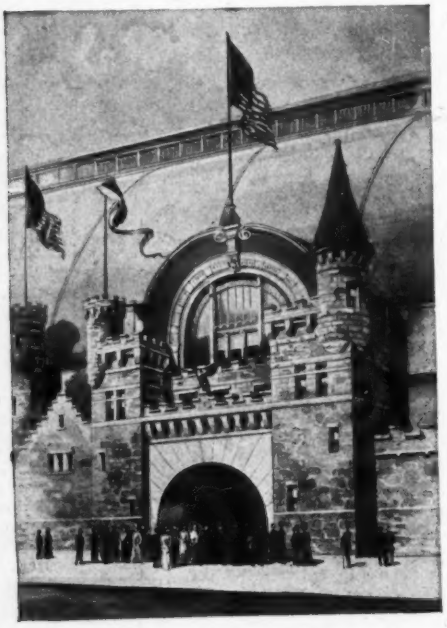
space be reserved for this or that firm that it has been found necessary to place the applications in the hands of prospective exhibitors that all might have an equal opportunity in securing locations to their likings.

According to the rules laid down for the management of the show, no allotments of space will be made before December 15, and, judging from the number of would-be exhibitors at Madison Square Garden who were compelled to take space in the annex or fail to get any at all, and judging also from the considerable number of firms who have

the manner in which the space is laid out. It is all on one and the same floor and all inclosed by the same four walls, considerably larger than Madison Square Garden. In short, it is the floor space of one vast amphitheater, 300 feet long by 170 feet wide. Galleries of ample seating capacity run around the four sides of the building. The spaces which are adjacent to the walls of the building are under this gallery, but, as the galleries are 18 feet above the floor at the lowest point, there is ample clearance for the highest omnibus to be run in and out of the spaces at the sides. Windows below

the gallery level insure ample light in these spaces by day, while the immense skylight amply lights the entire building. The many scores of arc lights and the many hundreds of incandescent lights make the building as light at night as in the daytime.

The track will be 20 feet wide—wide enough for three vehicles abreast—and is nearly 500 feet around. It will not be constructed with the idea of making it a speedway, but simply as a course on which the vehicles may be shown in action. A competent man with assistants will be



Entrance to the Chicago Coliseum.

placed in charge of the track to prevent excessive speed and accidents. The spaces within the track are on the same level as those outside and can be reached by crossing the track, when it is not in use, and by two bridges leading down from the galleries when it is in use. The galleries are reached by no less than five different stairways of ample width and easy rise. Gatemen will be placed at the gates to the track to prevent crossing at improper times and to make accidents impossible. All of the spaces within the track face on two aisles. Unlike the arrangement at Madison Square Garden, there are promenades on both sides of the track, which is visible from all parts of the galleries as well. The aisles are numerous and of ample width.

All exhibitors will be allowed the use of the track under certain easy restrictions. They will not be permitted, however, to move vehicles from exhibition spaces to the track at the inconvenience of the spectators. Stable room will be provided for vehicles which are desired for use on the track, independent of the exhibition spaces. The building is well equipped with toilet rooms and other conveniences.

The following is a copy of the rules under which spaces will be rented. They cover practically all points which can come into question:

RULES AND REGULATIONS.

The following rules and regulations will govern the First Annual National Automobile Exhibit, to be held under the auspices of the Motor Age, at the Coliseum, Chicago, March 23-30, 1901, and are a part of the application made on the face hereof:

APPLICATION FOR AND ALLOTMENT OF SPACE.

No allotment of space will be made before December 15, and under no circumstances will pledges be given of the reservation of any space prior to that date. Applicants are requested to make not less than three selections, numbered in the order of their preference. Should there be two or more applications for the same space, the management will be guided in its allotment by the date of the receipt of application, the amount of space applied for and the character of the exhibit. The management does not bind itself to allot to any applicant the full amount of space applied for, but should the amount be reduced the exhibitor will have the privilege of withdrawing.

Acceptance of space allotted must be made within fifteen days after allotment, and the acceptance must be accompanied by a check for 20 per cent of the amount of the rental of space. Acceptance of space allotted after Jan. 1, 1901, must be made at once, accompanied by check for 20 per cent of the amount of the rental of space.

PRICE OF SPACES.

The price of space, per square foot, as shown on the official diagram, is as follows: Spaces 26 to 32 and 42 to 56, inclusive, $1.00; spaces 1 to 25, inclusive, $1.25; spaces 57-60, inclusive, $1.50.

RECEIPT OF GOODS.

Goods must be plainly marked with the name of the exhibitor for whom it is intended and the number of the space, and

addressed to the Coliseum, Wabash avenue and Fourteenth street. Goods will be received only at the entrances at the south side of the building, after 8 a. m. on Thursday, March 21. A receiving clerk will receipt for the goods, and in turn will require a receipt from exhibitors. Goods on which there are express or other charges will be received, but exhibitors will be required to pay such charges before removing the goods from the storeroom. The management will not be responsible for loss or damage to goods consigned to its care, but will use all reasonable precautions for their safe keeping. Attendants will be provided to assist in the removal of goods from the shipping room to the spaces occupied by exhibitors.

ARRANGEMENT OF EXHIBITS.

The arrangement of exhibits must be completed before 6 p. m. on Saturday, March 23. Noisy or unsightly work after that hour will be strictly prohibited. Goods received after the opening day must be arranged in the spaces before 10 a. m.

CARE OF EXHIBITS.

Exhibitors must have their stands and exhibits cleaned, and otherwise put in proper shape, between the hours of 11 p. m. and 10 a. m. of each day. At no other time will work of this nature be permitted.

CHARACTER OF EXHIBITS.

The management reserves the right to decline or prohibit any exhibit, exhibitor, or proposed exhibitor which, in its opinion, is not suitable to an automobile exhibition. This reservation concerns persons, things, conduct, printed matter, souvenirs, catalogues and all things which affect the character of the exhibition. Exhibitors have the right to distribute catalogues, souvenirs, and other matter approved by the management, from the space occupied by them, but in no other way.

DIVISION OF SPACES.

No exhibitor will be permitted to sublet any part of a space, or to allow to be exhibited therein any other articles than those manufactured or sold by him.

SMOKING.

Smoking will not be allowed in the building at any time after 7:30 p. m., nor at any time where goods are being unpacked or stored. No exhibitor must allow any article to be brought into or any act done on the premises which shall vitiate or increase the premiums on the policies of insurance held by the owners of the Coliseum. Violation of this rule will annul the lease, and the tenant will forfeit to the management all moneys which may have been paid for rental.

OPENING OF THE SHOW.

The show will open to the public on Saturday, March 23, at 8 p. m., and each and every day thereafter, Sunday excepted, at 2 p. m., and will close each evening at 11 p. m. The morning sessions, from 10 to 1, will be open to the trade only, and to these sessions any automobile dealer or manufacturer will be admitted without charge by furnishing his card, or other proof of his connection with the trade to the clerk at the Bureau of Information.

ADMISSION OF EXHIBITORS.

Every exhibitor will be furnished one admission for each 20 square feet of space rented, for each day of the exhibition, good for exhibitors and their employes only. These will be supplied at the Bureau of Information to any properly authorized representative of an exhibitor at any time after 9 a. m. Thursday, March 21.

BUREAU OF INFORMATION.

A Bureau of Information will be located at the main entrance of the building. A representative will be in charge after 9 a. m. Thursday, March 21, and continuously thereafter until the close of the exhibition. Any information desired by exhibitors may be obtained there and not at any of the offices of the building.

INSURANCE.

Neither the management nor the Coliseum Company shall be held responsible for the safety of exhibits against robbery, fire, accident or any other destructive cause. If insurance is desired, it must be placed by the exhibitor.

REMOVAL OF GOODS.

Exhibits must be removed from the building by noon on Monday, April 1. To prevent loss of goods, the management will not permit any exhibit, or any portion of one, to pass out of any of the main entrances. The person in charge of removal will be required, if unknown to the clerk in charge, to present a written order from the exhibitor for the removal of the goods. Exhibits will not be permitted to leave the building at any time after the installation until after the close of the show.

VEHICLES IN MOTION.

A track will be provided for the exhibition of vehicles in motion, on which exhibitions may be given at periods arranged by the management and subject to such rules as may be prescribed by the management or persons appointed by it for the control of the track. The management will not be responsible for any damage to vehicles while on the track, but will endeavor to so control the movements of users that no damage may occur.

MAIL MATTER.

Exhibitors may have mail matter addressed to the building. It will be distributed from the Bureau of Information.

FACILITIES FOR EXHIBITORS.

A writing room will be provided for the transaction of business correspondence. A

public telephone and telegraph office will be found near the Bureau of Information.

Arrangements will be made with the express companies for the establishment of an office in the building for the accommodation of exhibitors at the close of the show.

SPECIAL RATE OF ADMISSION.

The admission fee will be 50 cents. Exhibitors may purchase special tickets, for distribution among their friends and customers, in lots of 100 at a discount of 20 per cent; 200, 33⅓ per cent; 300, 50 per cent. Should any of the special tickets be offered for sale, or given away to any improper person or persons, the purchaser will forfeit all rights to said tickets, and the management is authorized to confiscate them.

SIGNS—BUILDING WELL LIGHTED.

Signs may be made the entire length of spaces, but must be placed not less than eight feet from the floor. Exhibitors who use electric signs, or other electrical devices, must conform in all respects to the rules of the fire department and insurance underwriters of the city of Chicago. Attention is called to the fact that the building is splendidly lighted. Current for the illumination of electric signs may be obtained at reasonable cost, but it is essential that arrangements therefor be made not later than March 18. Arrangements will be made for the establishment of an office in the building by a competent sign writer and furnishers of other supplies.

OBSTRUCTIONS.

No obstruction must be placed between spaces below the height prescribed for signs. It is the object of the management to secure as free a view of the entire building as is possible to the character of the exhibit.

DAMAGING TO BUILDING.

No exhibitor shall injure or deface any part of the building, nor permit anything to be done by his employes whereby the premises shall in any manner be injured, marred or defaced.

OCCUPANCY OF SPACE.

The management reserves the right, should any rented space remain unoccupied on the opening night or at any time thereafter, to rent said space to any other exhibitor, but this clause shall not be construed as affecting the obligation of the exhibitor to pay the full amount of the rental agreed upon in case the management shall not so re-let the space.

EMERGENCIES.

All points not covered by these rules are subject to the decision of the show management.

A COMPACT ENGINE, GEAR AND AXLE

The accompanying illustrations, borrowed from the London Autocar, represent a combination of hydocarbon motor, carbureter and ignition device, compactly combined with the transmission gearing and rear axle, the whole occupying far less space than in vehicles commonly seen. The combined mechanism is being marketed by the British & Colonial Motor Co. of London, and is being sold to makers who desire to assemble rather than manufacture small vehicles.

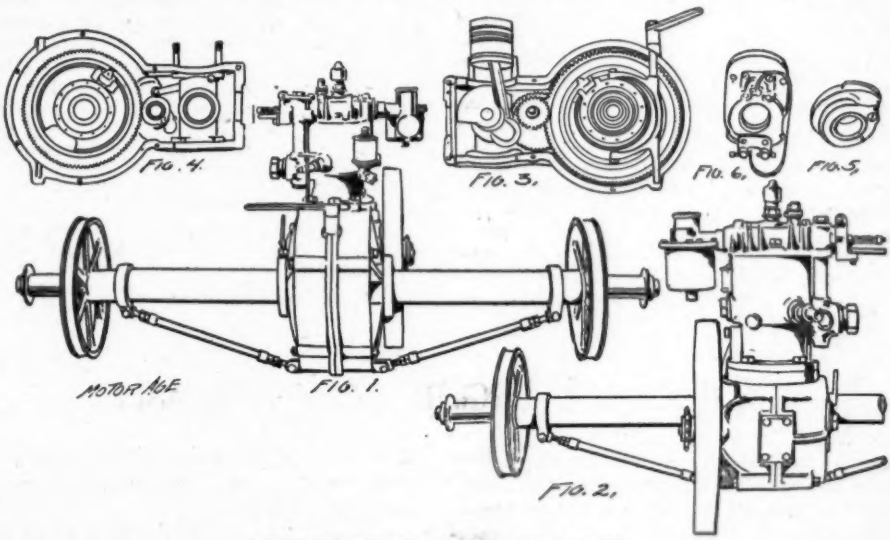
Figs. 1 and 2 show general views of the whole mechanism, from the rear and from the front, respectively. Fig. 3 shows a transverse view of the transmission mechanism which surrounds the rear axle, together with the piston, pitman and crank of the motor. Fig. 4 shows a view of the transmission mechanism, viewed from the opposite side, and includes a sight of the commutator portion of the sparking mechanism and the combined sparking, exhaust and governing cam. Figs. 5 and 6 show the cam and commutator.

The cylinder has a bore of 3 3-8 inches and a piston stroke of 3 1-2 inches. On the cylinder head is seen the sparking plug and the outlet for the water jacket. The carbureter is shown at the right hand side of Fig. 1 at the extremity of the inlet pipe. It is of the float feed variety. On the opposite side is the exhaust valve and chamber and the independent water connection between the cylinder head and the main water jacket of the cylinder. Lower down, on the right, is seen a drip feed lubricator and on the left a cock for emptying the water jacket when necessary. To the right, back of the axle, is the flywheel. The horizontal lever seen projecting from a boss in the upper central portion of the gear chamber is the lever by means of which the clutch is actuated

and the motor caused to drive the machine through the trains of gears, giving a higher or a lower speed. Below this lever is shown another for retarding or advancing the ignition spark. The axle sleeves each form part of the gear chamber and are strongly stayed from their outer ends to the bottom of the gear chamber by the struts shown.

In Fig. 2, to the left of the flywheel, is seen a sprocket wheel. Over this sprocket wheel is run a chain, by means of which the motor is started. This view also shows the crank chamber, which is likewise part of the gear chamber.

By reference to Fig. 3 it will be seen



COMPACT ENGINE, GEAR AND AXLE.

that a counter shaft carries pinions which are part of the transmission mechanism. This same shaft, which has just half as many revolutions as the crank shaft, also carries a cam, which actuates the sparking mechanism. This cam is shown in position in Fig. 4 and separately in Fig. 5. The pinions of the counter shaft mesh with spur gears which surround the differential gear on the driving shaft of the vehicle and which are always in mesh with their pinions. By means of a compact friction clutch one or the other of these spur gears may be made fast to the differential gear box and thus drive the vehicle. The clutch is operated by a wedge-shaped piece which is shown in Fig. 4, and in connection with the shifting mechanism in Fig. 3. The cam which operates the sparking mechanism is shown in Fig. 4 and behind it the commutator, or make-and-break device. This cam, however, has other functions. It actuates the exhaust valve and also acts as a governor, as it expands when given a sufficiently rapid centrifugal motion, and when expanded holds the exhaust valve open and prevents the motor from acquiring a too high speed.

The commutator is interesting from the fact that it is arranged to give two sparks, one immediately after the other.

No provision is shown for backing the vehicle and there are other points in which it is open to criticism—such, for instance, as the liability of the sparking device to become oily and refuse to work on this account. The entire construction, however, is very compact and shows what it is possible to accomplish in this direction. While it is hardly probable that any American manufacturers would care to put such a contrivance on the market, still the study of well-conceived efforts in the direction of compactness, as well as in other directions, are worthy of study, and it is for this reason that the drawings and description have been borrowed.

CONSTRUCTION OF A MOTOR VEHICLE

THE PRACTICAL CONSTRUCTION OF A MOTOR VEHICLE ADAPTED FOR USE IN CONNECTION WITH THE FOUR-HORSEPOWER GASOLENE MOTOR ALREADY DESCRIBED IN THE MOTOR AGE

BY L. ELLIOTT BROOKES

PART VII.

The spring blocks for the rear axle springs are not detailed, but are of the same design and material as for the front axle, except that the hole for the axle is 1¾ inches in diameter, and that the centers for the holes for the axle clips should be ¼ of an inch more than for the front axle. This refers, of course, to the dimensions at right angles to the axle, the other dimension for the center of the holes across the spring seat, of course, remaining the same.

The front and rear springs are 30 inches long, center to center of heads, and are made of three leaves, 1¼ inches wide, by ¼ inch thick, and are 8 inches inside measurement when light.

Do not try and use stock springs, which generally come 33 or 36 inches center, and about 6 inches inside measurement, light. They will give too much of a jumping-up-and-down motion to the body, when going over rough or uneven roads, and will not give the easy riding that the springs specified will. The writer found this out from experience with this kind of springs. In the first place they are too flat for motor vehicle work, having nearly twice the deflection for the same loading as the 30-inch springs. The action of the body springs in a motor vehicle is different from that in an ordinary carriage. In one case the vehicle is propelled by being pushed, in most cases, while it is pulled in the case of the horse drawn vehicle. And if the vehicle is built with a view to use on country roads, the spring leaves had better be 1¼x5-16 inches, instead of 1¼x¼, as specified.

If the stock springs are used no blame can be attached to the writer if the novice finds himself, when going along at a fair rate of speed, in the condition of one learning to ride a trotting horse, viz., the seat and rider separating and meeting violently about fifteen times a minute. The sensation is not pleasant to say the least.

Bearing plates should be fitted to the springs, outside on the upper half of the spring and inside on the lower half. One of these bearing plates is clearly shown in place on the front axle springs in Fig. 2. These should be made of 1½ x 3-16-inch bar iron, and notched 1-16 of an inch to receive the axle clips, so as to prevent them from moving. This is an important feature, and should not be omitted, if it is desired to prevent the springs from working loose. Plates are also required for the upper halves of the springs, to go underneath, with four holes for the clips, as shown. These should be not less than ¼ of an inch thick, and a center hole should be drilled, so as to put in a square head bolt with a nut, to clamp the spring together before attaching it in place to the body, by means of the clips. If these points are carefully taken into consideration, no trouble will be experienced from the springs working loose.

After the clips are finally put in place the ends of the threaded portions should be slightly riveted over to prevent any possible loss of the nuts.

Before commencing the assembling of the vehicle, the last of the details will be taken up. Fig. 5 shows an assembled view of the ignition controlling device. It is located in front and below the seat as shown in Figs. 2 and 3. The dial plate should be made of cast iron, and a nice light pattern is needed for it. The lever or handle can be of bronze, or a forging can be made if desired. Two stops, as shown, are fitted into the upper portion of the deal plate, to limit the movement of the lever. The lower quadrant can be graduated as desired. The shaft is made from a piece of ½-inch steel, with a shoulder turned on one end against which the controlling lever hub sets. It is se-

curely fastened to it by an ⅛-inch pin, which should be a driving fit and afterwards riveted over. The lever in the rear of the dial plate should be made of bronze and fastened on the shaft, also by a pin, as shown. Before doing this, however, a compression spring should be made, with a ½-inch hole, and 2¼ inches long, from No. 28 piano wire, and slipped on over the 7-16-inch shaft. Then the rear lever can be fastened in place the same as the front one. This spring is for the purpose of holding the ignition controlling device wherever it may be set and is far simpler and just as positive as using a ratchet and quadrant with notches, and besides, will give closer variations of the ignition.

Fig. 76 shows the levers which go on either end of the shaft, which is carried in the sleeve or tube, on the side of the tank frame, as shown in Fig. 2. These are of bronze, and a pattern will be needed.

Fig. 77 shows the small brackets which go upon the 1¾-inch angle, forming the right hand upper portion or side of the tank frame. These are of cast iron and are held in place on the flange of the angle by two ⅜-inch hexagon head cap screws.

The tube and shaft which form the connection between the ignition controlling device in front of the seat (Fig. 75), and the ignition cases on the motor in the rear of the vehicle, are not shown or detailed. The sleeve is made from 1-inch, seamless, drawn tubing, ⅛ of an inch thick, and the shaft from ¾-inch cold rolled, or drawn steel. The shaft should be turned down to ⅝ of an inch in diameter along its center portion, so as to leave a bearing in each end of the tube, or sleeve, of about two inches. The

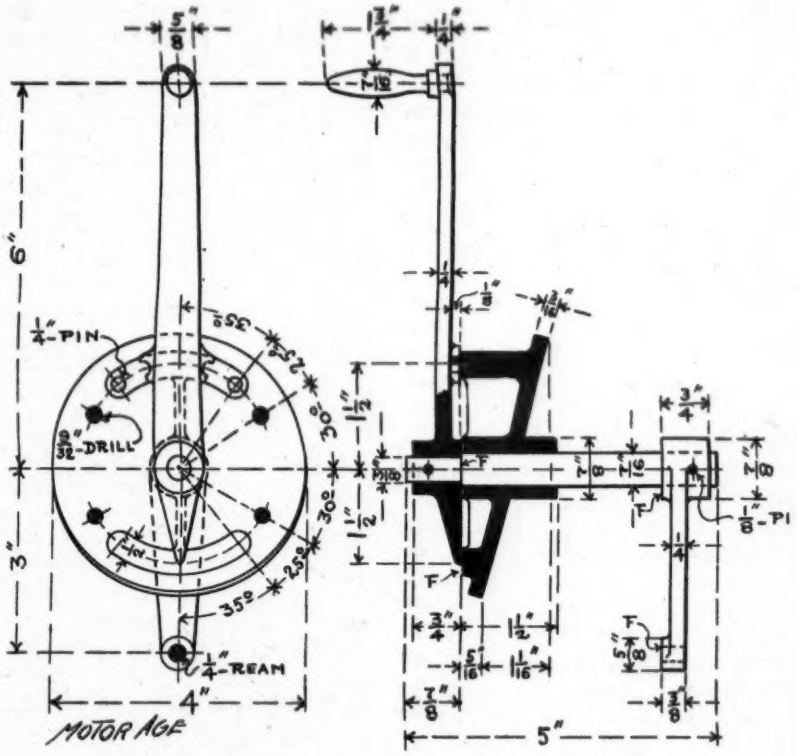


FIG. 75.—IGNITION CONTROLLING MECHANISM.
Shaft—Steel.
1—Complete.
Dial—Cast Iron.
Levers—Bronze.

sleeve is held in place in the brackets (Fig. 77), by ¼-inch, 20 thread, square head, cup point set screws.

The assembling of the vehicle will now be taken up. The first thing to do is to

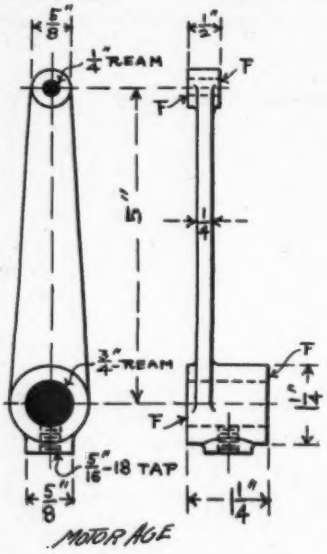


Fig. 76.—Ignition Controlling Sleeve Levers. 2—Bronze.

get or make a pair of horses about two feet high, and slightly longer than the width of the frame—say about 34 inches. Place one of these under the frame (Fig. 5), about eighteen inches from the rear end and the other under the front part of the frame, far enough back to clear the front wheels.

Before fixing the frame on the horses permanently, get three blocks of hard wood. Two of them should be about 8 inches long and 3 inches deep and as wide as the top of the horse, which should not be less than 2 inches at least. Cut a notch in each of them, about ½ of an inch deep and ⅝ of an inch wide to receive the side bars of the frame. Fasten one of them firmly to each outer end of the rear horse by means of two long wood screws. Do not use nails. Put the side bars of the frame in these slots the proper distance from the rear of the frame—about 18 inches as before stated. Then take the third block, which should be long enough to take in the curved portion of the frame at this point, which will be about the same distance from the front axle, or the center of the front axle swivel, as the other horse is from the rear of the frame. Notch this block the same as the rear ones, except that it must fit the curved portion of the frame. Having done this, get the horses and frame lined up on the floor in such a position, that, when the motor is in place, a belt can be attached to the driving gear end of the crank shaft, from a convenient countershaft having a tight and loose pulley so that the motor can be operated by the power outside itself. There are two reasons for this—first to limber it up, which requires about three days steady running of at least eight hours per day, and secondly, to properly adjust the motor, viz., the carbureter, valves and ignition mechanism. This will save the builder lots of time, lots of trouble, and lots of thinking. For instance, when the motor is completed, there are generally four reasons why it will not work properly. First, the working parts may be too snugly fitted and this can be properly remedied by running the motor by means of a belt and pulley, and flooding it with oil; second, the proper adjustment of the carbureter; third, the operation of the valve mechanism; and fourth, the ignition or sparking mechanism. By the

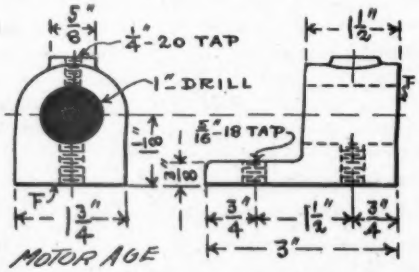


Fig. 77.—Ignition Controlling Sleeve Brackets. 2—Bronze.

means before stated one can start the motor running with the belt, note the action of all the moving parts, see that the sparking plugs are in working order, close the battery switch and start the motor running itself, as soon as explosions throw off the belt and watch the motor run and find out what the trouble is, if any. This method of testing the motor

has saved the writer many weary hours of pumping up the motor by hand, and also enabled him to find out the defects in its operation and construction and has helped him to remedy them. It takes only a little time to fit up the belt and get a pulley of the proper size and width of face (a two-inch belt is required) and saves the builder a great deal of time and a sinful lot of profanity—for if there is any one thing on the face of the earth which will make a man lose all chance of future salvation it is a balky gasolene motor.

The object of supporting the frame on blocks upon the horses is to allow the connection pipes from the motor to the water tank to clear the horses; it also facilitates matters in getting around amongst the pipes and connections.

To again take up the assembling, first establish a center line upon the frame, longitudinally, through the center of the swivel stub in front, and back to the rear of the frame, indicating it at each cross bar by a center punch mark, which should be very accurately located. Then, with this center line as a base, locate the lateral center lines of the transmission shaft, motor and rear axle.

The next thing to do is to put the motor in place upon the angles j, and, after lining up carefully and getting it absolutely at right angles to the longitudinal center line of the frame and also central of this line, and at the proper distance from the transmission shaft center (which should be 21¾ inches), to mark through the holes in the feet of the crank chamber onto the angles j.

The motor can then be removed and the holes in the angles drilled out, which can be done nicely in a drill press. Do not try to locate the motor, the auxiliary driving shaft bracket and the transmission shaft brackets at one and the same, as inaccuracies are sure to result unless all the various parts are made to gauge and templet and afterwards fitted or measured by overall assembling jigs to test their accuracy (which jigs would not be possible or profitable to have made, unless vehicles were being built in large quantities). So it is better to be on the safe side and locate the various mechanisms, one at a time, successively, in the order in which they go together, commencing with the motor. In this manner any slight errors in drilling the holes or locating the various brackets, may be found out and corrected as the work progresses, or allowance made for them, in the next operation. It will actually take longer to assemble all the mechanisms in place and locate the various holes, by marking through the feet of the different brackets on the frame bars at one operation, than to put them up one at a time as before stated. Besides, there is less liability of mistake in forgetting to mark through some of the holes, when only three or four are located at the one time.

While the holes are being drilled in the angles j, the carbureter may receive attention, for a few minutes. It requires a slightly different combination than shown in Fig. 76, Chapter V of the "Construction of a Gasolene Motor," viz., the various parts are swung around into different positions from what are shown in that figure. It was stated in the description of the carbureter that it could be arranged in any desired position. An extra elbow is required, as shown in Fig. 78, to throw the carbureter body slightly to the right hand side of the admission pipe (looking at the motor from the rear of the vehicle). The carbureter body is placed as shown, longitudinally, and parallel with the center line of the vehicle. The globe, angle and vertical check valves are connected to the carbureter body so as to be at its left hand side, and parallel with the motor. The gasolene inlet pipe is on the right hand side of the needle valve chamber, and, by means of a right angle turn, the connecting pipe passes under the right hand cylinder of the motor and to the under side of the gasolene tank, to which it is connected by means of a union, as shown in Fig. 2. The gasolene pipe, as shown, has an elbow connection at the end next to the carbureter, and a long turn or 90 degree bend where it turns up to connect to the gasolene tank. This is to prevent any accumulation of petroleum jelly from being deposited at this point, which is liable to happen if a short turn elbow con-

nection is made at this point. At the end next to the carbureter it is readily accessible for cleaning purposes, but not so handy at the other end, at the gasolene tank connection. To make this bend in this pipe, which should be ⅛-inch brass pipe (iron pipe size), take a block of wood sufficiently large to form this bend (which should not be less than 4 inches, inside radius), cut a groove in it deep enough so that the pipe will go entirely into it, make this groove in the block half round, using one end of the block for this purpose, and make the bottom diameter of the half round groove 8 inches. Have the block long enough so that the block and the short end of the pipe can be held in a vise securely while bending. Next take the pipe and stop up the end on which the bend is to be made with a ball of waste packed tightly in the end of the pipe. Then get about 3 or 4 pounds of rosin (in lumps, not powdered), heat it in an iron ladle until it flows freely, taking care, however, to place a large sheet of tin or thin sheet iron between the ladle and the fire to prevent any liability of the rosin catching fire. When thoroughly melted pour the rosin into the pipe at the open end. When thoroughly cold the pipe can be placed in the vice with the plugged end between one jaw of the vise and the groove in the block. The reason for making the half round groove in the block is that in bending the pipe to shape it will be found necessary to pull it around the block considerably more than a quarter turn (on account of the springy qualities of the pipe) to make the desired 90 degree turn.

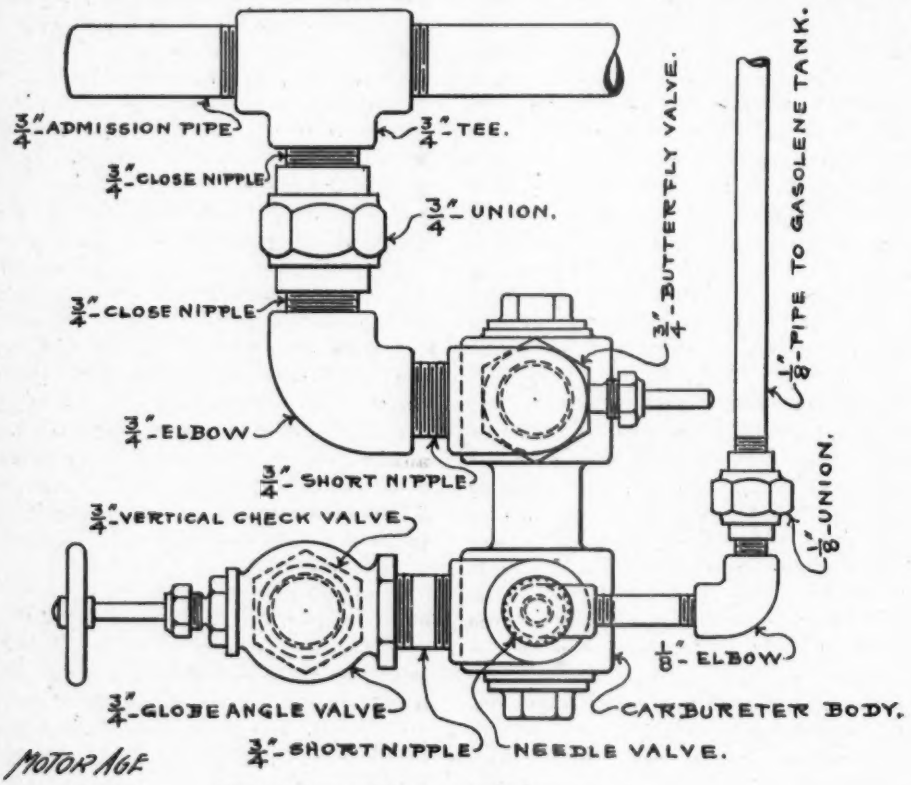


FIG. 78.—PLAN OF CARBURETER.

It is, perhaps, the better way in doing this job to cut the threads on each end of the pipe before bending, cutting off the pipe a trifle longer than necessary, and also cutting the threads a little fur-

ther down each end of the pipe than is required. After the pipe is bent, the exact length can be ascertained by measurements, and the surplus threaded portion of the pipe cut off.

To remove the rosin from the pipe, heat it slowly over a Bunsen flame, commencing at the end which was plugged up, and passing the pipe slowly through the flame. Do not heat the pipe along its middle portion first, as this is a dangerous proposition, as the rosin is liable to suddenly come out from the end of the tube with a velocity equal to a shot from a rapid fire gun, and probably do some one an injury. Before filling the pipe with the rosin or bending it, perhaps the better plan to avoid a crack at the bend is to heat it in a forge fire at the point where the bend is to be made to a red heat and then dip it into cold water. This will thoroughly anneal brass pipe and it can be polished up after it is bent with very little trouble.

After the holes have been drilled in the angles of the frame, put the motor in position upon them, and again carefully line it up so as to get it exactly at right angles with the center line of the frame. Then put on the driving gear (Fig. 38) on the end of crank shaft securely in place. Take the auxiliary driving shaft bracket (Fig. 35); put the driving shaft (Fig. 36) in place in the bracket, putting on the shaft at their respective ends the rawhide gear (Fig. 37) and the bevel pinion (Fig. 14); put the bracket in place between the angles h and i of the frame, with the rawhide gear (Fig. 37) meshing properly with the driving gear (Fig. 38). Before going further, level up the frame (Fig. 5) upon the horses. Use as large a spirit level as can be obtained so as to get it accurate. When the frame is properly leveled, level the auxiliary driving shaft bracket, while clamped in position between the angles n and i, see that the driving gear (Fig. 38) and the rawhide gear (Fig. 27) mesh properly and that their faces coincide with each other. Then work through the holes in the bracket on to the legs of the angles n and i. It is a good plan to put a thin sheet of paper between the teeth of the spur gears when adjusting them into proper positions, so as to prevent any bind in the teeth after the auxiliary driving shaft bracket is finally put in place.

The holes in the angles n and i will have to be put in with a small ratchet drill, as they are not accessible to a drill press. This, however, is a very short job, as there are only six 13-32-inch holes, for ⅜-inch bolts.

After these holes are drilled and the auxiliary shaft bracket put in position, with shaft and gear in place, it will be a good plan to use the starting crank on the motor, and turn the gears around and see that everything is free.

This should be done with scarcely any effort, if everything is lined up properly, and the compression cocks of the motor open. Another easy way to accomplish this is to remove the inspection hole covers from the top of the explosion chambers on the cylinder heads.

WEEKLY PATENT OFFICE BUDGET

DESCRIPTION OF LEWIS' FRICTION TRANSMISSION ON WHICH HIS COMPANY REFUSED TO SPEND MONEY—EISENHUTH CONTRIBUTES ANOTHER FREAK

The few patents this week are not of any great merit. One relates to the construction of George W. Lewis, on which was based the inflated Lewis Motor Vehicle Co. of Philadelphia, which, after spending a considerable amount of money, divided its assets among its stockholders, reduced the amount of its capital stock to avoid taxation and is now doing nothing. Those at the head of the company claimed that it would be impossible to build a satisfactory vehicle, embodying the construction that Mr. Lewis advocates. The Motor Age cannot agree, after a study of the patent specification, that it is at all impossible, but whether or not it would be profitable is another thing. The device, however, appears quite within the bounds of practicability. Mr. Lewis has always claimed that he has been treated very shabbily.

The self-styled "banker-inventor," John W. Eisenhuth, contributes another of a voluminous series of patents. If all inventors were as prolific as Eisenhuth a "tariff for revenue only" would be unnecessary in the United States. A tire patent concludes the week's offerings.

LEWIS' FRICTION TRANSMISSION

Letters Patent No. 661,409, dated November 6, 1900, to George W. Lewis of Chicago; friction transmission device; sixteen claims allowed.

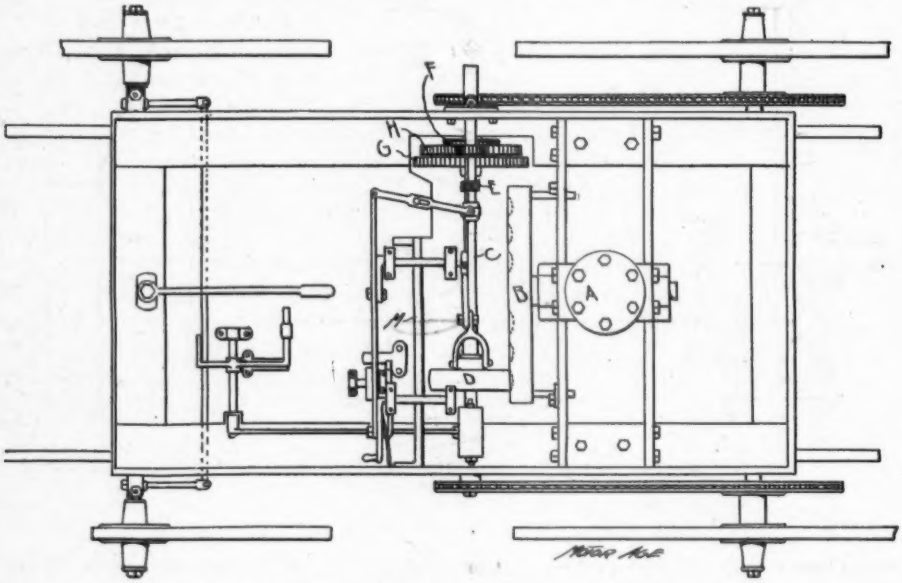


FIG. 1—PLAN VIEW OF LEWIS' TRANSMISSION MECHANISM.

Mr. Lewis believes in friction transmission. He uses a single cylinder, vertical, gasolene motor, having a crank shaft disposed longitudinally of his vehicle. On the forward end of this crank shaft there is a flywheel, which also serves the function of a friction disc. The motor is indicated in Fig. 1 by A and the flywheel-friction disc by B. On a transverse shaft, C—parallel to the face of the flywheel—is a friction wheel, D. The flywheel, B, is provided with a series of concentric grooves, into which the curved periphery of the friction wheel,

D, is designed to fit, to give it a firmer frictional contact. By means of a combination of levers the friction wheel, D, can be drawn out of engagement with the flywheel, B, and shifted to engage with any of the grooves on either side of the center of the flywheel, thus giving a forward or backward direction to the vehicle.

On the shaft, C, are two pinions, E and F, which are designed to mesh with the two spur gears, G and H, surrounding the differential gear, K, on the shaft, L. The shaft, C, is slidably carried in a bearing at one end and is actuated by a lever at the other, by means of which the pair of gears, E and G, can be brought into mesh, or the other pair, F and H. In this manner a positive decrease of speed and an increase of power is provided for emergencies.

On either end of the shaft, L, is a sprocket wheel which is connected with a corresponding sprocket wheel on the inner side of the hub of each rear traction wheel. The shaft, L, as before stated, is provided with a differential gear, and the rear wheels are mounted loosely on the rear axle.

Another feature of Mr. Lewis' patent is his method of braking. Parallel to the face of the flywheel, B, and the shaft, C, is a plate, M, of any suitable material. By an accentuated movement of the lever which throws the friction wheel, D, out of engagement with the friction disc, B, the friction wheel, D, will be brought into contact with this plate, M, and this contact with the stationary plate will tend to prevent the revolution of the friction wheel, D, and will make it act as a brake to the vehicle by retarding the motion of the gears E and G, or F and H, the shaft, L, and the sprocket wheels, chains and traction wheels.

The methods of operating the vehicle in other particulars do not differ from those commonly adopted by other constructors.

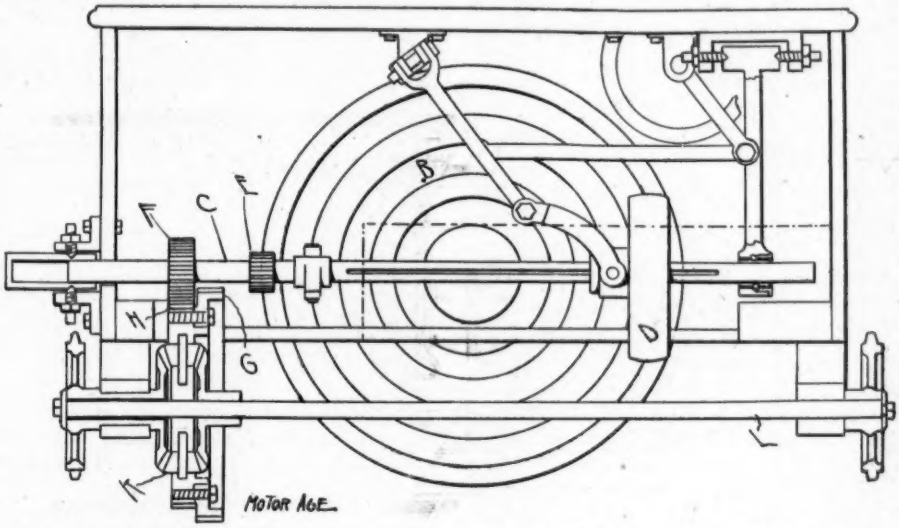


FIG. 2—FRONT SECTIONAL ELEVATION OF LEWIS' TRANSMISSION MECHANISM.

EISENHUTH'S TRANSMISSION MECHANISM

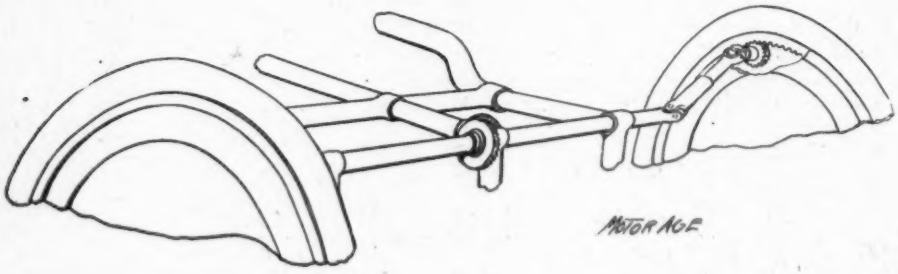
Letters Patent No. 661,210, to John W. Eisenhuth, New York City, assignor by mesne assignments to Mamie G. Read, same place; running gear and transmission mechanism; eight claims allowed.

Mr. Eisenhuth has been granted numerous patents on motor vehicles in which the distinguishing feature has been the wheels. Each of these has been formed of a non-revolving central disc and a rim mounted in ball bearings on the periphery of this disc so that the rim of the wheel alone will revolve. The revolving rims of Mr. Eisenhuth's driv-

ing wheels receive their impulse through the medium of internally toothed gears which are integral with the rims and pinions carried on the ends of a counter shaft. Various devices for the construction of vehicles embodying this basic principle have been described in previous issues of The Motor Age, including devices for steering by turning the non-revolving disc centers of the front wheels.

The principal feature of the present patent relates to means for both steering and driving by means of the front wheels, in connection with driving by means of the rear wheels. In the present instance the rear wheels are driven by means of a transverse shaft, having a pinion on each end which meshes with the internally toothed gear on the revolving rim of the rear wheel. At the center of this transverse shaft is a bevel gear which meshes with another bevel gear on a longitudinal shaft. This longitudinal shaft has a second bevel gear at its forward end (shown in the illustration). This bevel gear meshes with another bevel gear on a second transverse shaft. This transverse shaft is provided on each side of the center with two universal joints. The portions between each two universal joints is composed of two pieces telescoped, one within the other, in such a manner that the distance between the joints may be increased or diminished, while the two telescoped portions are forced, by means of a groove and feather, to revolve as one. Each end of this shaft is carried in a bearing which is fastened to the non-revolving, central disc of one of the front wheels, and also carries a pinion which meshes with an internally toothed gear on the revolving rim of the wheel.

The arrangement is all very clever (?) but the item of friction, in goodness knows how many bearings, has evidently been entirely forgotten. The Motor Age believes that the time will come when certain classes of motor vehicles will be driven by both front and back wheels, but never in the manner in which the "banker-inventor" proposes. When it is stated that the device is ingenious nothing more remains to be said in its favor.



EISENHUTH'S FRONT WHEEL DRIVING MECHANISM.

DAVID'S TIRE

Letters Patent No. 661,099, to James Bamford David, Neath, England; vehicle tire; three claims allowed.

This device provides a wheel which combines a rubber tire with a species of spring device within the tire. The wheel is of the suspension variety and has a rigid rim to which the spokes are fastened and which has lateral projections. These lateral projections are imbedded in two annular parts composed of rubber, or rubber and canvas, and are carried in an outer metal rim, which, with its rubber face, is U-shaped. The device may very well be characterized by a capital N and a capital G.

SELDEN PATENT LITIGATION

New York, Nov. 12.—Judge Coxe of the United States Circuit Court handed down a decision on November 5 overruling the demurrer of the defendants in the suit of the Electric Vehicle Co. against the Winton local agents in the matter of the Selden patent.

The decision was first made public in the daily papers on Friday. Misapprehension of the true state of affairs led to the erroneous statement that the decision was a final one and not merely a preliminary one on a mere technical demurrer. Among those not conversant with the real facts the erroneous news caused considerable sensation, and other ridiculous stories followed in the daily press.

The Motor Age representative at once visited the Electric Vehicle Co.'s counsel and later saw Mr. Brown of the Winton Motor Carriage Co. It was soon made manifest that the decision was merely a preliminary one and regarded by neither party as a notable victory or a decisive defeat.

To-day your correspondent had a chance to investigate the decision more thoroughly.

The demurrer raised the point that the patent on its face was void, in that it admitted priority of use by other makers. In other words, the defendants' point was that the facts as stated, even if true, did not constitute a cause of action, because priority of invention was admitted.

Now that the preliminary legal sparring is over, the fight will begin on the real merits of the case. Judge Coxe gave the defendants twenty days in which to file an answer to the original complaint.

Judge Coxe's decision, which is set forth in full below, gives the points of the demurrer and his opinion of them. Even though the decision does not finally dispose of the case, some of the opinions of the learned judge will be found valuable and instructive reading for those engaged in hydrocarbon gas engine manufacture or use. The judge said:

"The bill, in the usual form, is based upon letters patent No. 549,160, granted November 5, 1895, to George B. Selden for a road vehicle, the motor being a liquid hydrocarbon gas engine of the compression type. The application was filed May 8, 1879.

"The demurrer, though divided under five separate heads, is based upon the broad proposition that the patent, on its face, is void for lack of patentability.

"Stated generally, the argument for the defendants is as follows: The specification concedes that all of the elements of the combinations of the claims were old; that steam engines were employed to propel road wagons, liquid fuel being used to generate steam; that gas engines were old and their use, as well as that of other motors, had been proposed for tram cars and similar vehicles. This being the admitted state of the art, it is argued that it did not require an exercise of the inventive faculty to substitute a gas engine for a steam engine in a well-known self-propelling vehicle.

"It is insisted, further, that the claims do not cover combinations, but are for aggregations merely.

"The law is very plain. A patent must not be held invalid upon demurrer unless its invalidity so clearly appears that no testimony can change the legal aspect of the case. If doubt exists the complainant is entitled to its benefits; if the faults pointed out by the defendant may, by any chance, be cured by proof; if, in short, there be a possibility that the complainant may succeed, the demurrer should be overruled. Am. Fibre Co. v. Buckskin Co., 72 Fed. Rep. 508.

"It should be remembered that the invention, if there be one, was made very early in the history of 'horseless carriages.' The court will take judicial notice that prior to May, 1879, the art of propelling vehicles by motors, carried by the vehicle itself, was in its infancy. These carriages were unknown to the

streets of New York and few were seen on the streets of Paris. They were, without exception, crude and tentative machines. Selden must, therefore, have been among the earliest experimenters in the art. If the thousands of steam and electric 'automobiles' which now are constantly perambulating the streets of every large city had been available as models the task of constructing a successful 'gasmobile' would have been less difficult. In other words, the fact that Selden's work was done over twenty-one years ago should not be lost sight of in estimating the value of his achievements. Upon the present record he must be regarded as the first to construct a road locomotive provided with a liquid hydrocarbon gas engine of the compression type so arranged as to leave the platform of the carriage unobstructed.

"The drawings of the English patents referred to show locomotives designed to run upon rails and, therefore, presumably, upon levels or light grades.

"This was not the problem which was solved by Selden. He has made, or it must, on demurrer, be assumed that he has made, a self-propelling vehicle which is capable of traveling on ordinary country roads, going up and down hill, and making long distances without replenishing its fuel receptacle. Surely, it required invention to construct such a machine.

"But in order to test the proposition still further let it be assumed that steam carriages and electric carriages similar to those in common use to-day were known prior to 1879 and that gas motors had actually been used to propel, upon common roads, the heavy and clumsy structures shown in the drawings of the English patents.

"This statement of the prior art assumes three most pregnant facts not found in the record, but, even so, how stands the case? Is it fair to assert that, in no circumstances, could it involve invention to create the patented machine because similar machines had been propelled by electricity and steam and machines, differing radically in structure and purpose, had been propelled by gas? Was there nothing more than the new application of an old device to a well-known class of vehicles?

"It is thought that the complainants are entitled to a more liberal interpretation of the patent than that contended for by the defendants.

"The patentee's contribution to the art should not be considered from a narrow point of view; his work should not be examined through an inverted telescope; the horizon of invention should not be contracted to the periphery of a sixpence.

"The patent described an ingenious and complicated machine operated by a type of engine never used before in road locomotives, employing with safety a highly volatile and dangerous fluid. The carriage of the patent is easily handled; it economizes space and may be managed by one possessing no expert knowledge.

"It cannot be maintained, upon the English specifications alone, that the construction of such a machine required no inventive skill. It is possible, if not probable, that a light road carriage equipped after the English plan would prove a lamentable failure.

"The doctrine invoked by the defendants, that the transfer of an old device to a new use does not involve invention, if applied without qualification or exception, would destroy many of the most valuable patents. See Potts v. Creager, 155 U. S., 597.

"At pages 606 and 607 the court discusses a large number of situations in which the rule is inapplicable and concludes with the following pertinent observation:

" 'Indeed, it often requires as acute a perception of the relation between cause and effect, and as much of the peculiar inventive genius which is characteristic of great inventors, to grasp the idea that a device used in one art may be made available in another as would be necessary to create the device de novo.'

"The court is clearly of the opinion that the immense weight of authority sustains the proposition that this patent cannot be held invalid on demurrer.

"The court has refrained from discussing the subsidiary questions mooted on the briefs, as they may appear in a to-

tally different light after the proof is presented.

"The demurrer is overruled, with costs. The defendants may answer in twenty days."

Cleveland, Nov. 13. — Vice-President Henderson of the Winton Motor Carriage Co. was asked to-day what effect the decision made by Judge Coxe relative to the Selden patent would have upon the plans of the company for the future. He stated that the decision simply meant that the Winton company and the members of the Hydrocarbon Motor Vehicle Manufacturers' Association, which was formed some time ago for this purpose, would now be obliged to defend the case on its merits. Secretary Brown of the company, who is also secretary of the association, is at present in the east and is giving the case his attention. It is probable that the reply to the suit will be made in a few days, if it has not already been done. Mr. Henderson said that, so far as could be learned from this point, there is no inclination among the members of the association to withdraw from the responsibility they assumed when the organization was formed, and a strong defense will be made.

The decision will have no effect upon the plans outlined by the Winton company. No halt will be called in the factory improvements that are under way and no change will be made in the output. As stated when the suit was brought, the Winton company is assured of its position, and purchasers of the Winton vehicle will be protected from all annoyance.

Mr. Henderson stated that a similar demurrer had been filed in the case brought by the present plaintiffs against the Buffalo Gasolene Motor Co., and he thought it quite probable that a similar decision would be rendered by the court at Buffalo, in which event the association would be called upon to defend that suit as well.

A PAGE OF GASOLENE MOTORS

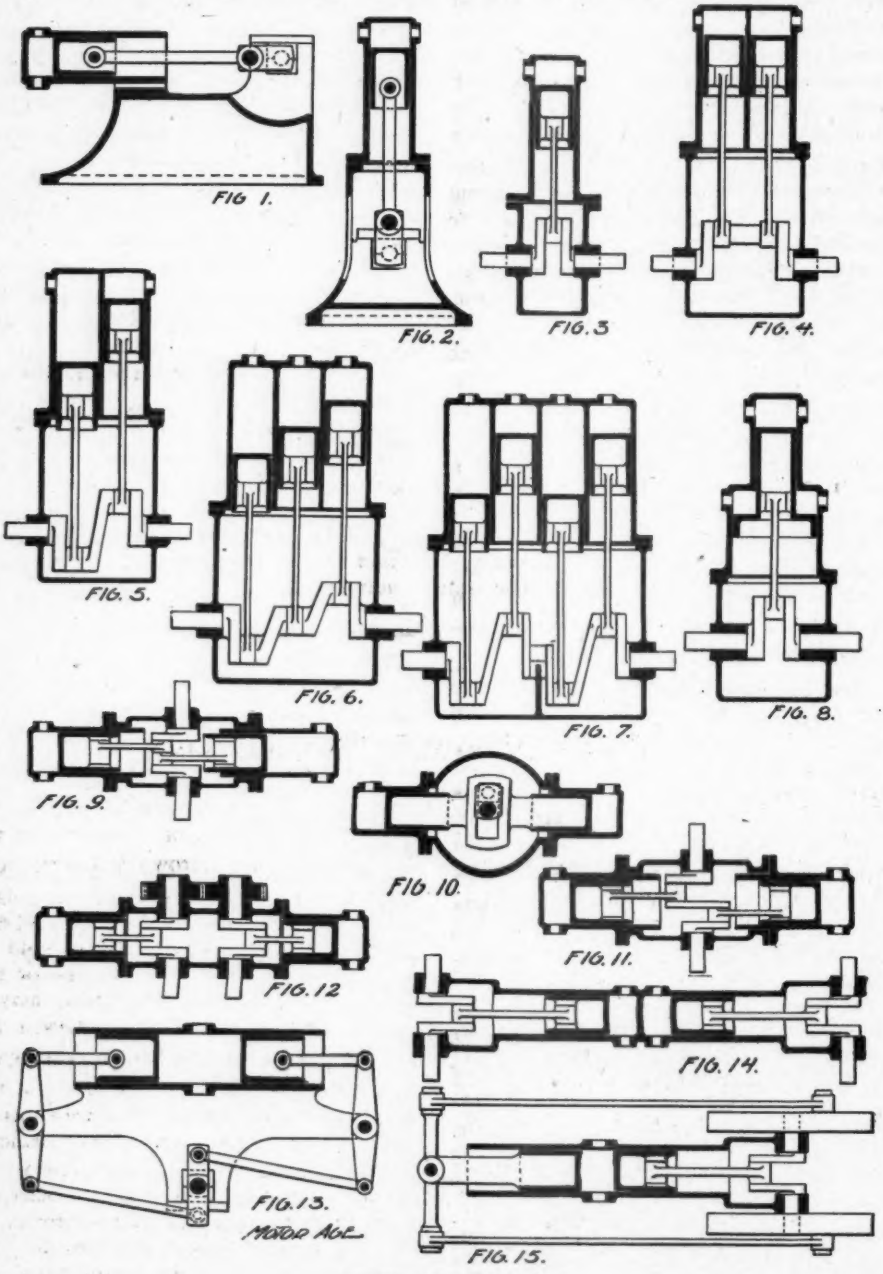
Some time ago the writer was requested, by a mechanical engineer of some note, to give his opinion on the merits of a gasolene engine which was said to "work on an entirely new and highly economical principle." The mechanical engineer's experience, in the particular line of hydrocarbon engines, had been limited and he had the good sense to realize the fact that the engine on which he was to give an expert opinion for some capitalists who were contemplating giving financial aid to the "inventor," might not be new, although it was new to him. While he did not believe, with the "inventor," that the engine was destined to "revolutionize the automobile industry," still he was thoroughly interested and quite favorably impressed.

When the two visited the "inventor," he, after much hesitation, produced the drawings of what he modestly pronounced to be a "world-beater." The drawings consisted of a number of very crude sketches on brown wrapping paper, made with a soft black crayon and elaborately cross sectioned with red and blue pencil lines. A single glance told the writer that the motor was one of that class which, in plain English, may be called "freak motors." It showed that not a little ingenuity had been displayed in its design—but it was old. Its type may be seen in one of the drawings accompanying this article. The principle which it embodied was covered in the American and foreign patent offices a number of years ago, and so far it has "revolutionized" nothing, except the bank account of the unfortunate individuals who have stood the financial stress of trying to make it commercial.

The "inventor," when closely questioned, admitted that he had studied the pat-

ent office reports in the public library industriously, but "that they contained nothing like his motor." Possibly he believed what he said, but it is doubtful.

This incident is not related as merely an amusing circumstance, but as a typical sample of circumstances which are of almost daily occurrence all over this country—and others, as well, doubtless.



TYPES OF MOTORS.

With the knowledge of a number of such circumstances in mind, an endeavor has been made to show, pictorially, the prin-

ciples on which work the best known types of successful and unsuccessful motors. The fact that a given type of motor has been invented, patented, exploited and experimented upon, does not seem to afford any grounds for preventing its re-inventing, re-patenting—in England, at least—re-exploiting and re-ducing the bank accounts of sanguine inventors and gullible promoters. Few know of the hundreds of variations of the simple forms here shown. No attempt will be made to comment on the merits of various types.

Fig. 1 represents, in outline drawing, a section of the simplest form of single-cylinder, horizontal, four-cycle stationary, gas or gasolene motor, with valves, flywheel and gearing removed, so as to indicate merely the general style of construction.

Fig. 2 shows a similar drawing of a vertical, single-cylinder, gas or gasolene engine.

Fig. 3 is a view of a single-cylinder gasolene automobile motor, with enclosed crank chamber. This may be used in either a vertical or horizontal position, at the option of the builder.

Each of these types has one impulse for each two revolutions of the crank shaft.

Fig. 4 shows a two-cylinder, enclosed crank chamber motor with both pistons attached to the same crank pin. This type of motor can have an impulse or working stroke at each revolution, or two in one revolution, and then an idle revolution, but the latter is not to be desired, as it is the same as a single-cylinder motor.

Fig. 5 is a similar two-cylinder, enclosed crank-chamber motor, but has its crank pins set diametrically opposite or 180 degrees apart. This type has two explosions or impulses one right after the other and then two idle strokes—or two impulses during one revolution of the crank shaft and none the next.

Fig. 6 shows a three-cylinder motor, also with enclosed crank chamber. This motor has one and one-half explosions or impulses to each complete revolution of the motor, or three successive impulses to two revolutions of the motor.

Fig. 7 shows a type much used abroad by a prominent automobile firm, and has two impulses to each revolution of the motor, making the action of the motor similar to an ordinary steam engine.

Fig. 8 represents a type of double-piston motor, which is designed to have an impulse or working stroke in each revolution, the principal objection to this type is that the body of the smaller piston is exposed to both the heat of the burning gases and to the corrosive action of the exhaust products.

A type of double cylinder motor is illustrated in Fig. 9, which has both pistons connected to the same crank pin, the operation of this motor is similar to the one described in Fig. 5.

Fig. 10 shows a similar style of motor, in which the connecting rods are dispensed with, and the pistons are connected together by what is known as the "Scotch yoke." The operation is the same as the motor shown in Fig. 5.

Fig. 11 is another type of double cylinder motor, with a double-throw crank. In this type of motor the working parts are practically balanced, and it has an impulse or working stroke at each revolution, or may have two impulses in one revolution and then an idle revolution.

Now will be discussed a few types of what may be termed "freak motors," as the especial advantages over the others just described are not apparent.

Fig. 12 shows a double-cylinder motor with two separate crank shafts, geared together as shown. It is obvious that in this form of construction the impulses or explosions may be set to operate as described for either Fig. 10 or Fig. 11.

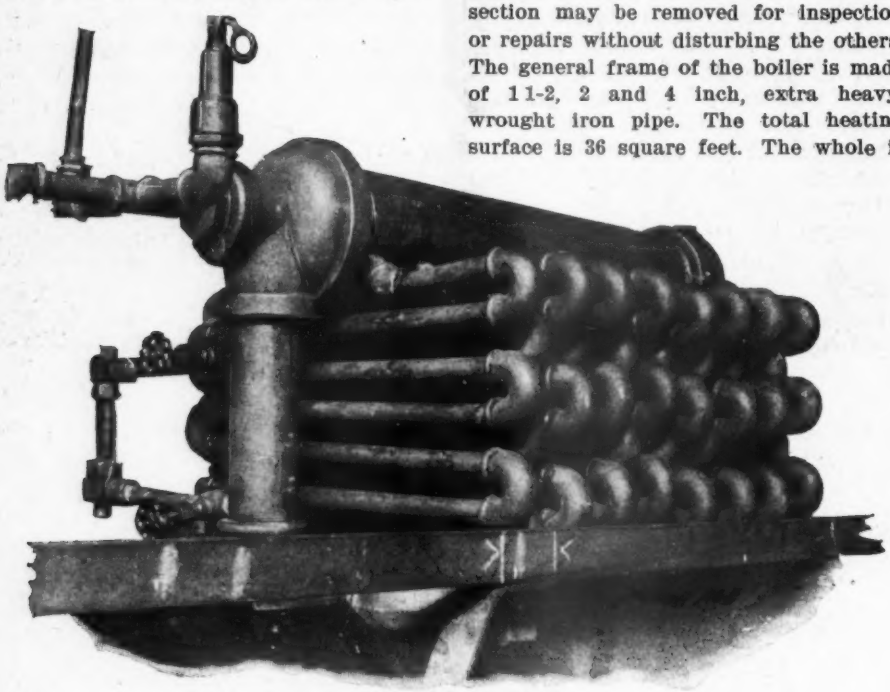
Fig. 13 shows a form of balanced motor which is in use on an automobile abroad, its operation is the same as a single-cylinder motor.

Fig. 14 is another type of balanced motor, except that it has two cylinders. This is also in use abroad. It has two simultaneous explosions or impulses and then three idle strokes.

Fig. 15 is similar in its operation in most respects to the motor described in Fig. 14. It is differently connected, but accomplishes the same result.—L. E. B.

GITHENS' WATER TUBE BOILER

H. A. Githens, at one time famous as a bicycle racing man, but now manager for a Cleveland branch store of the bicycle trust, and C. M. Raymond of that city have recently constructed a steam vehicle for their own use which shows several unusual features in steam vehicle construction, as detailed in the accompanying illustrations. In general appearance the carriage is much the same as the standard type of steam runabouts except that it is heavier and somewhat longer. In construction the chief differences lie in the engine, boiler and burner.



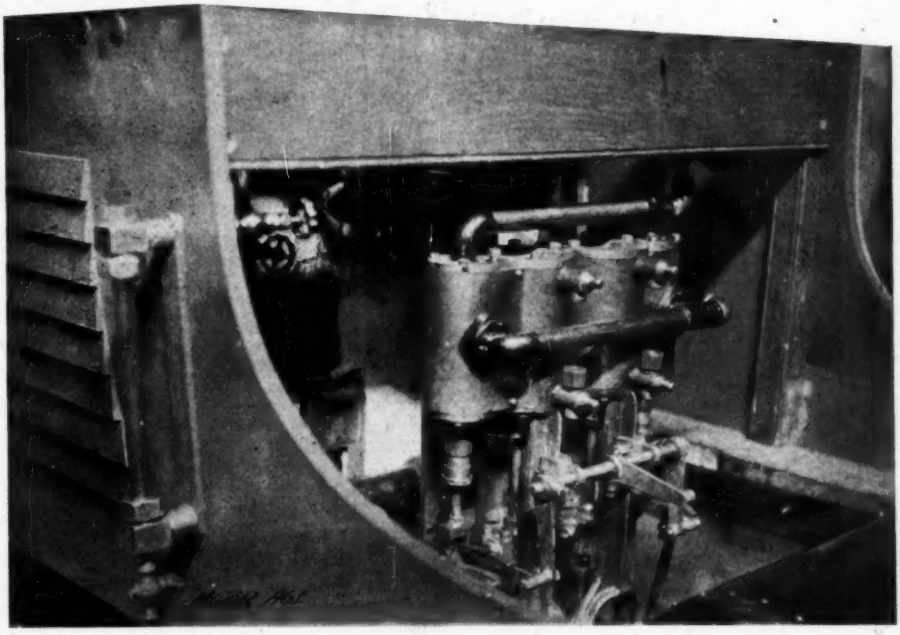
GITHENS' WATER TUBE BOILER.

The motor is a two-cylinder, piston valve, reversible engine, size 2 1-2x3 1-2, purchased from J. M. Mason of Boston.

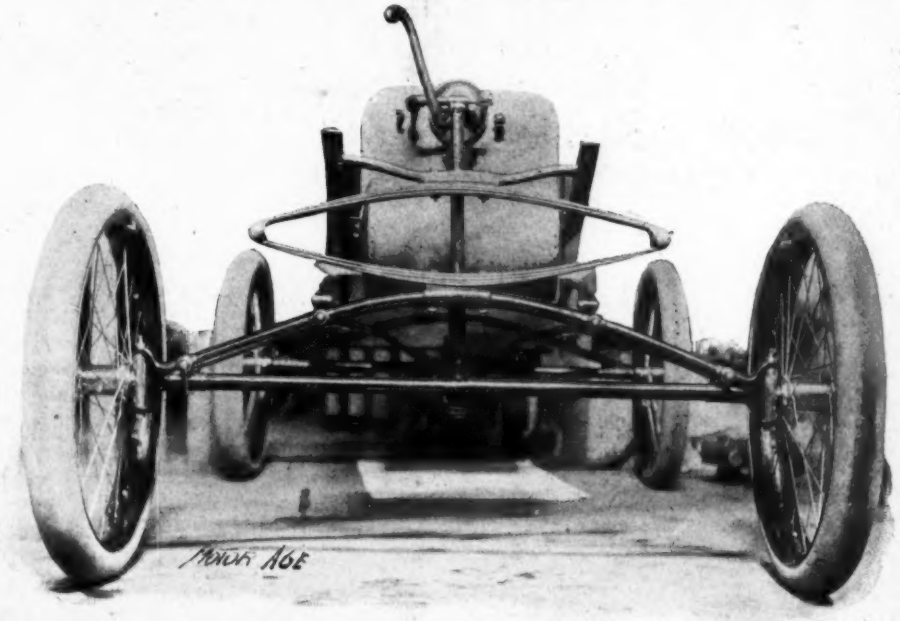
Instead of the usual cylindrical shell boiler having copper fire tubes, the boiler used is of the water tube type, of the builders' own design, similar in principle to naval boilers of this type. The boiler has 112 tubes, divided into 16 sections, the arrangement being shown in the illustration. Each section is connected to the steam dome by right and left nipples, so that, if necessary, a single section may be removed for inspection or repairs without disturbing the others. The general frame of the boiler is made of 1 1-2, 2 and 4 inch, extra heavy, wrought iron pipe. The total heating surface is 36 square feet. The whole is covered by a steel shell, the dimensions being 18 1-2x18 1-2x15 inches. To protect against foaming and to insure dry steam a baffle plate, made of copper and perforated at the top, is placed in the steam drum between the heating tubes and the dry pipe to the engine, the latter being a perforated pipe running the full length of the drum at the top.

The designers of this boiler have found that its chief claim for superiority over the ordinary copper flue is the fact that, being made entirely of steel, the possibility of burning and ruining the

boiler when, by accident, the water gets too low, is reduced to a minimum. In several tests the burner has been left on full blast with the water supply to the boiler cut off, until the water was entirely evaporated, and the lower tubes were heated to a cherry red; the fire was then cut off and after an elapse of five



VIEW OF ENGINE, UNDER THE SEAT.



FRAME WITH GASOLENE TANK AND BOILER MOUNTED.

minutes the boiler was refilled, the burner lighted and steam raised to 150 pounds without any indication of damage to the boiler. It has withstood a cold water test of 500 pounds to the square inch.

As a quick and easy steamer the boiler has shown superior qualities. In tests it has evaporated 450 pounds of water within the hour, at an average steam pressure of 150 pounds. The boiler has been in daily use for the past four months and has given perfect satisfaction. In the half-tone illustration the boiler is temporarily equipped for testing with water glass and safety valve. In the vehicle the water glass is carried to the outside of the body, as usual. If desired, test cocks could also be placed on the main pipe leading to the dome.

The burner is square and has burner tips that can be easily removed and replaced in case they become burned out. Vaporizing the gasolene for starting the burner is effected by the use of a torch or alcohol pan. In the burner there is a pilot light which is used when the vehicle is standing. The usual diaphragm cuts the flame down at 160 pounds pressure and the steam "blows off" at 225 pounds. The muffler for the engine is placed within the boiler shell and the superheating of the exhaust does away with considerable of the condensation in damp and cold weather. A feed water heater is also placed within the muffler. The boiler is provided with an injector and an auxiliary hand pump.

Another feature, somewhat out of the ordinary, is that the engine, boiler, all tanks and piping are sustained on an angle iron frame which is carried on the running gear and not suspended from the body of the carriage. The body can be detached in a very few minutes by simply removing the water glass and four bolts, an arrangement which has been found several times to be a great convenience. The ordinary arrangement of the throttle valve and reverse is reversed; incidentally, it might be mentioned that this fact was discovered in a startling manner a few days ago by an enthusiast who had been accustomed to a standard make of vehicle. He threw the throttle wide open, supposing it to be the reverse, and the acrobatic performance which occurred can better be imagined than described. Fortunately the vehicle was standing in the open, or there would have had nothing to describe at the present time.

Three-inch tires are used and the vehicle is of standard wagon tread. It has been in daily use for the past four months and in planning another the designers find little room for improvement.

GITHENS OPERATING HIS VEHICLE.

A STUDY IN WHEEL CONSTRUCTION

The following letter to The Motor Age, from T. G. Salsbury, a French engineer of repute, embodies some deductions in regard to wheel construction with which The Motor Age does not entirely agree. This is, however, one of the problems of motor vehicle construction which will well bear discussion.

The tests in behalf of which Mr. Salsbury argues would be, as he says, interesting and instructive, but it is doubtful if the motor vehicle will ever be perfected on lines which are drawn from the results of scientific experiments, no matter in what careful manner they may be conducted. Such experiments would, and doubtless will, be of value in the future, but the more valuable data will be furnished by the experiments of vehicles in the hands of every-day users, and the noting of what types give the best results. Without further digression, Mr. Salsbury's letter will be given:

"It is strange that in the motor vehicle industry more careful attention has not been paid to the subject of wheels, which, in fact, have been the most neglected of any part of the vehicle as far as careful, scientific investigation is concerned. Such being the case, will it not be well to consider the subject?

"It is certain that the larger a wheel is the more nearly its periphery approaches a straight line, and the smaller is the angle formed between its periphery and the ground, with the apex of the angle at the point of contact of the wheel with the ground. The larger the wheel the more nearly does its periphery coincide with the plane of the road and the greater is the leverage to surmount obstacles, and the more gradual will be the rise and subsidence of the wheel and the body which it carries.

"One objection to the use of large wheels is their comparative frailty. But by widening the hubs this may be overcome. As for the extra weight, it will have little effect, as the traction effort is decreased and the mere rolling of the wheels of themselves requires little power.

"A large wheel, which clears obstacles more readily than a small one, will be less affected by rough roads. A fair comparison can be obtained by considering the action of a pendulum, considering the hub of the wheel as the axis of the pendulum. The amplitude of variation of the pendulum depends on the length of the suspension wire. Another objection to the large wheel is the additional strain by transmitting the power through the axle, but it must also be considered that by decreasing the angular speed of the wheel the same reduction is made in that of the gearing.

"The small wheel seems, at first, to combine many essential features—solidity, small strain on the axle by the transmission of power, lightness and cheapness. This is all right, but, speaking mechanically, one must not build a machine strong in one part at the expense of strength in another—or, in this case, to strengthen the wheel at the expense of its resiliency, which will endanger the adjacent parts. Each small obstacle in the path of a small wheel forms a wedge which is only surmounted by the inertia of the vehicle carrying the wheel, which certainly absorbs a considerable amount of energy. Every bicycle rider knows the difference between riding on a cobble stone pavement and a smooth roadway. On the one a slow speed requires more exertion than a fast speed on the other, but the butcher's cart, with its big, five-foot wheels, rumbles along over cobble stones or smooth macadam at equal speeds and with apparently little difference in exertion on the part of the horse. The mechanical energy lost in the small wheel is not the only thing, but is accompanied by constant vibrations and constantly recurring shocks, which, by their reaction, absorb still more energy.

"The cycle trade created the tension wire wheel, which has many advocates

among motor vehicle builders, especially those who build small vehicles—and particularly on this side of the Atlantic—while almost all of the large vehicles have wooden wheels. Here is another problem. Which is the better, the wire or the wood wheel?

"It appears that the wire wheel will maintain its place for small vehicles, at least, but only because the question of price will forbid the greater expense of the wooden wheel. But from the mechanical point of view it does not seem the equal of the wood wheel in any respect. The vibrations in the wood wheel are periodical, while those in the wire wheel, carried by the steel, spread and make new vibrations constantly. These vibrations do not localize themselves in the wheel, but extend perceptibly to the whole vehicle.

"These problems are very delicate ones when all the features are taken into consideration, and it would be highly interesting and more highly instructive to learn the results of really serious experiments.

"A small wheel starts more easily and more quickly than a large one, owing to its greater stiffness, but for that very reason fails to absorb, to any degree, the shocks, whereas the large wheel, with its greater elasticity, eliminates the greater part of the ordinary vibrations before they have time to reach the body of the vehicle. It might be argued that this very elasticity of the large wheel interferes with its efficiency. Under ideal conditions this argument would be sound, but when the advantages and disadvantages of each type of wheel are weighed in the balance, it appears that the large wooden wheel seems to have the best of the argument, especially when it is considered that the large wheel allows of the use of a tire with a narrower tread.

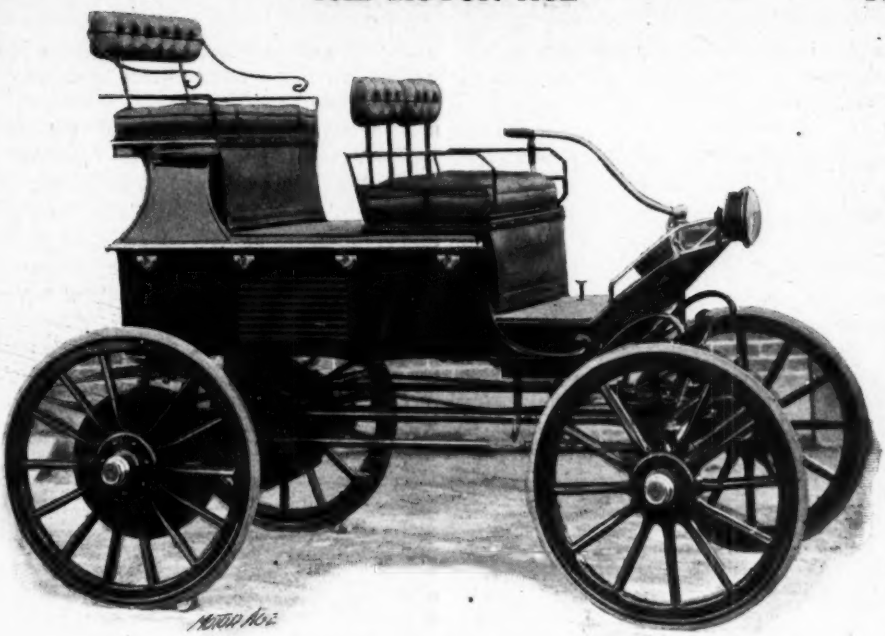
"Another point which should receive attention is that of the comparative sizes of front and rear wheels. There appears to be no valid reason why they should not be of the same size. Where they are of the same size it is a comparatively simple matter to have a reserve tire, which can be substituted in case of puncture or other accident to one on either front or rear wheels."

NATIONAL COMBINATION VEHICLE

Considerable attention was attracted at the Madison Square Garden show by a combination vehicle exhibited by the National Automobile & Electric Co., of Indianapolis. This vehicle is, of course, an electric. The feature which attracted attention, however, was its convertibility from a delivery wagon to a brake and vice versa.

The vehicle is shown as a brake in the first illustration, and as a delivery wagon in the second. By an arrangement of slotted tubes, attached to the sides of the lower body, the delivery top can be attached or detached, having slides to engage with the slotted tubes. This top can be replaced by a rear seat and the vehicle is transformed into a four-passenger brake, as shown in the second illustration. The manufacturers claim that the change from one style of vehicle to the other can be accomplished in three minutes.

The battery in this vehicle is said to be very powerful and to give a radius of travel of from 45 to 50 miles on a single charge. The motor is thoroughly encased and develops 2½ horsepower. It is geared directly to the rear hubs of the vehicle. The running gear is built with a frame of steel tubing, wood wheels and solid rubber tires. Ball bearings are used throughout. The lights are electric, as is the gong, the current being drawn from the battery. A combination volt and ammeter is carried. The vehicle has five speeds forward, varying from three to fourteen miles an hour, and three



NATIONAL CONVERTIBLE BRAKE.

NATIONAL CONVERTIBLE DELIVERY WAGON.

speeds backwards. It is regularly upholstered in leather and is highly finished. The price is $1,500.

NELSON MAKES NEW RECORDS

In a paced race match race with H. B. Stone of Denver, Johnny Nelson of Chicago, made new indoor records for several of the miles up to fifteen miles, at which distance the race was run. The fifteen miles were covered in 25:49 1-5. The previous in door records were made at Chicago and were held by Michael. Nelson's fastest mile was done in 1:34, which beats the indoor record, also. The mile scratch event was won by Gus Lawson, in 2:12 4-5.

CONSTRUCTION OF A MOTOR QUADRICYCLE

The Motor Age has completed arrangements for a series of articles, to be run under the above caption, which will deal with the construction of a motor quadricycle. The description will be fully as complete as that given in the series on "The Construction of A Gasolene Motor" and the other series, which is now almost completed, on "The Construction of a Motor Vehicle." Full working drawings will accompany the description, so that any machinist, having a small, fairly well equipped shop, will be able to construct the quadricycle.

The description will be given for the benefit of small makers, but its careful perusal by all manufacturers will prove valuable, as it will contain many valuable hints from a practical man.

The quadricycle is designed with the idea of obviating, in it, some of the drawbacks that are found in many vehicles of this type. It will be readily convertible into a tricycle, if the builder desires it to be convertible. However, The Motor Age believes that a vehicle of this type, even when used by only one person, is more desirable in the form of a quadricycle than that of a tricycle. To this end the vehicle is so designed that the front seat may be removed without giving the vehicle the "something wanted" appearance that would characterize most of the present quadricycles, if the front seat were removed. If it is so desired, a box may be substituted for the front seat, to carry luggage, when it is desired to use the cycle for touring purposes.

The quad is fitted with a speed change gear, which gives two speeds. The application of the brake throws the motor out of gear, making it possible to stop the quad very quickly.

The construction of the motor is unique. It is air-cooled, and, by a very simple device, the cylinder is scavenged of all burned gases which scavenging serves the double purpose of assisting in cooling the cylinder (from the inside) and of giving a clean and an extra powerful charge at each impulse.

FRENCH "ALCOHOL CRITERIUM"

The second "alcohol criterium," or road trials of vehicles using alcohol in whole or in part for fuel, has been run under the auspices of the Parisian sporting daily, Le Velo. More interest attaches to the use of alcohol as a fuel in France than in America, owing to the fact that gasolene, or "essence," as it is called there, is higher priced than in this country, and because alcohol is relatively cheaper. Experiments by French builders and chaffeurs have not shown that commercial alcohol gives as good results as gasolene, either when the volume of the two fluids is taken into consideration or when the relative costs of the two is the basis of comparison.

It has been found, however, that a mixture of alcohol with certain hydrocarbon oils has resulted in producing a compound that is cheaper than gasolene and quite as efficient as fuel in internal combustion engines, volume for volume. Several firms offer liquid fuels the formulas of which they guard religiously. One, Lepretre, however, furnished a compound composed of fifty percent of commercial alcohol mixed with fifty percent of benzine and obtains results quite as good as those obtained with the ordinary grade of gasolene and at a considerably less cost. The retail price of the mixture is 55 centimes per liter, as against 70 centimes for gasolene. The wholesale price of commercial alcohol is 55 francs per hectoliter and that of benzine 35 francs.

In the criterium, which was over a course from Paris to Rouen, there were fifty-two entries, fifty-one starters and thirty who finished. The number of entrants show the interest that is being taken in the use of the new hydrocarbon mixtures. The winner turned up in Giraud in a Panhard. He was accompanied, as was each of the other contestants, by a judge appointed by the committee in charge of the event. The fuel used was the compound of Lepretre which has just been described.

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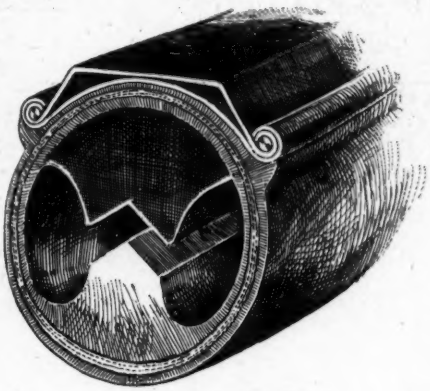

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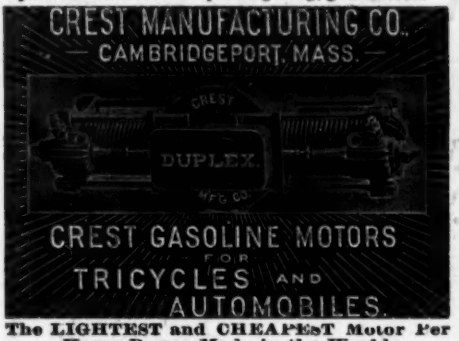

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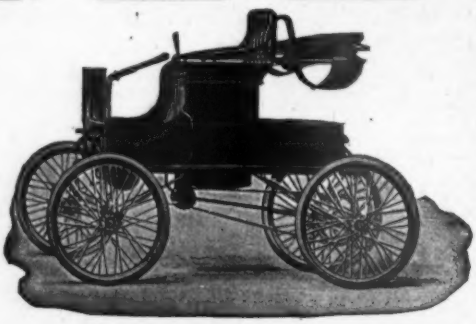

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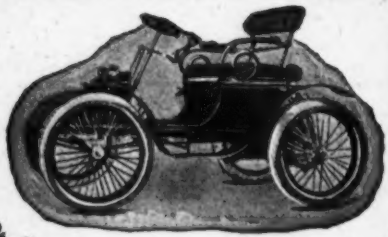

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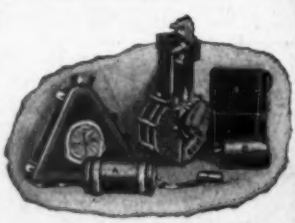

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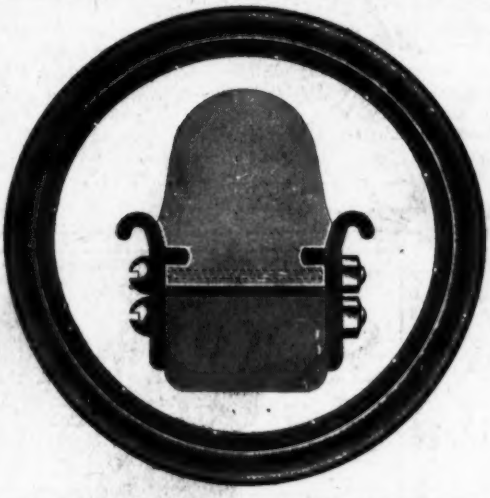

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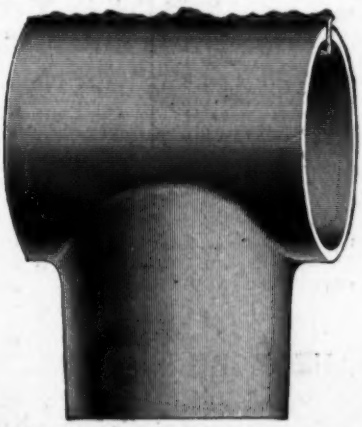

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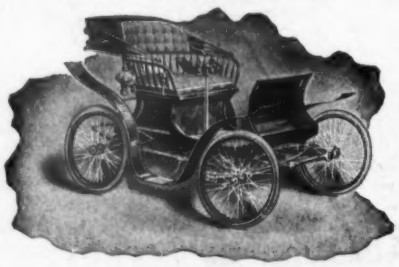

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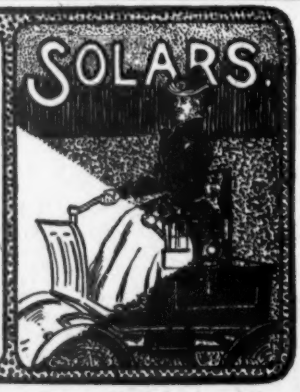

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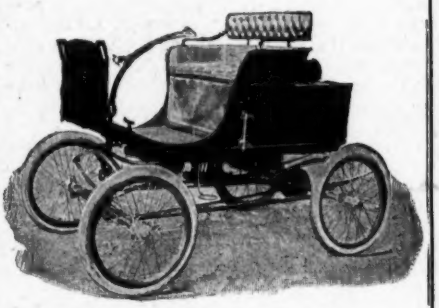

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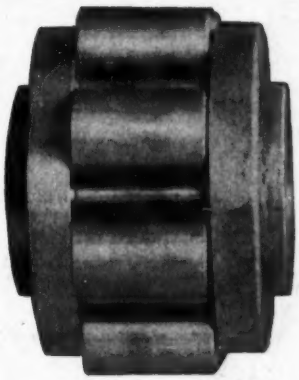

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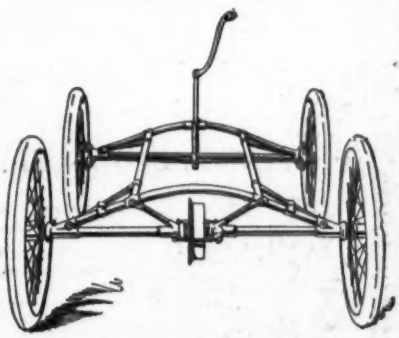

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